
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

Form 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

001-35061

(Commission File No.)

NeoPhotonics Corporation

(Exact name of Registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation or organization)

94-3253730
(I.R.S. Employer
Identification No.)

2911 Zanker Road
San Jose, California 95134
(Address of principal executive offices, zip code)
Registrant's telephone number, including area code:
+1 (408) 232-9200

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Exchange on Which Registered
Common Stock, par value \$0.0025 per share	New York Stock Exchange
Securities registered pursuant to Section 12(g) of the Act:	
None	

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act of 1933. Yes No

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer		Small reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

As of June 30, 2018, the approximate aggregate market value of voting stock held by non-affiliates of the Registrant, based upon the last sale price of the Registrant's common stock on the last business day of the Registrant's most recently completed second fiscal quarter, June 30, 2018 (based upon the closing sale price of the Registrant's common stock on the New York Stock Exchange), was approximately \$215,597,000. This calculation excludes 10,300,284 shares held by directors, executive officers and stockholders affiliated with our directors and executive officers.

As of February 28, 2019, the Registrant had 46,426,672 outstanding shares of Common Stock.

DOCUMENTS INCORPORATED BY REFERENCE

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The Registrant has incorporated by reference into Part III of this Annual Report on Form 10-K portions of its Proxy Statement for its 2019 Annual Meeting of Stockholders to be filed pursuant to Regulation 14A. The Proxy Statement will be filed within 120 days of Registrant's fiscal year ended December 31, 2018.

NEOPHOTONICS CORPORATION
ANNUAL REPORT ON FORM 10-K
For the Fiscal Year Ended December 31, 2018
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PART I

ITEM 1. BUSINESS

FORWARD-LOOKING STATEMENTS

You should read the following discussion in conjunction with our Consolidated Financial Statements and the related “Notes to Consolidated Financial Statements” and “Financial Statements and Supplementary Data” included in this Annual Report on Form 10-K. This discussion contains forward-looking statements including statements concerning our possible or assumed future results of operations, business strategies, competitive position, industry environment, potential growth opportunities and the effects of competition. Such statements are based upon our management’s beliefs and assumptions and on information currently available to us. Forward-looking statements include statements that are not historical facts and can be identified by terms such as “anticipates,” “believes,” “could,” “seeks,” “estimates,” “expects,” “intends,” “may,” “plans,” “potential,” “predicts,” “projects,” “should,” “will,” “would” or similar expressions. Forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. These risks, uncertainties and other factors in this Annual Report on Form 10-K are discussed in greater detail under the heading “Risk Factors.” Given these uncertainties, you should not place undue reliance on these forward-looking statements. Also, forward-looking statements represent our management’s beliefs and assumptions only as of the date of this Annual Report on Form 10-K. You should read this Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. Except as required by law, we assume no obligation to update these forward-looking statements, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future.

CONVENTIONS THAT APPLY IN THIS ANNUAL REPORT ON FORM 10-K

Unless otherwise indicated, references in this Annual Report on Form 10-K to:

- “3G” refers to third-generation wireless architecture;
- “4G” refers to fourth-generation wireless architecture;
- “5G” refers to fifth-generation wireless architecture supporting IoT, or Internet of Things;
- “10G” refers to 10 Gbps;
- “100G products” collectively refers to all products sold by us designed for use at 100Gbps (“100G”), and in coherent transmission systems designed for use at 100Gbps or higher data rates. Some customers may use components designed for use at 100G at lower speeds. Our 100G products include both coherent transmission products and 100G network products that are not coherent;
- “400G products” collectively refers to all products sold by us designed for use at 400Gbps (“400G”), and in coherent transmission systems designed for use at 400Gbps or higher data rates.
- “III-V compound semiconductors” refers to compound semiconductor materials made from group III and group V elements of the periodic table, such as Indium Phosphide and Gallium Arsenide;
- “Access” refers to the portion of the telecommunications network that connects subscribers to their carriers network;
- “Advanced Hybrid Photonic Integration” refers to state-of-the-art integration of multi-platform materials and devices;
- “CDC” refers to Colorless, Directionless, and Contentionless;
- “CDM” refers to a Coherent Driver Modulator which integrates a coherent I/Q modulator and drivers in a micro-mod package;
- “China” refers to the People’s Republic of China;
- “Cloud” refers to a large and geographically dispersed network of computing platforms, servers and interconnecting communications that can be accessed by users from any location to perform tasks and access information;
- “Coherent” refers to optical transmission systems that encode information in the phase of an optical signal and decode such information through comparison with an independent laser at the receiver and digital signal processing;

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- “Contentionless” refers to the ability to switch two or more channels of the same wavelength or color from different directions through the same switch, such as a Multi-Cast Switch (MCS);
- “CWDM” refers to Coarse Wavelength Division Multiplexing;
- “DCI” refers to Data Center Interconnect;
- “Design win” refers to a confirmation by a customer that a product or group of products may be used as part of a customer’s product and we have a purchase order for such products;
- “Dissaggregation” refers to the trend in optical communications to separate software and hardware platforms so that different parts of a system can be supplied by different vendors;
- “Drop Modules” refers to wavelength multiplexer modules;
- “ECL” refers to External Cavity Laser;
- “EML” refers to Electro-absorptively Modulated Laser;
- “Flex Coherent” to a class of 100G transceivers and line cards in which the modulation format, and hence the reach and data-rate, can be altered by software command such that the same optical hardware can be used for metro, long-haul or, in some cases, data center interconnect applications;
- “Gbps” refers to gigabits per second;
- “High Speed Products” refers to transmitter and receiver products as well as switching and other component products for 100G optical transmission applications over distances of 2 to 2,000 kilometers. Our high speed 100G and beyond products are based on our Advanced Hybrid Photonic Integration technology. These technologies support encoding 100 gigabits or more per second of information for transmitting over a single channel and decoding the information at the receiver;
- “ICR” refers to Integrated Coherent Receiver;
- “ITLA” refers to Integrable Tunable Laser Assembly;
- “IoT” refers to the Internet of Things;
- “Long Haul” refers to fiber optic communications between central offices in different cities, where distances range from a few hundred to two thousand kilometers;
- “Low Speed Transceiver Products” refers to our access and low speed transceiver product lines;
- “LTE” refers to Long-Term Evolution wireless architecture;
- “Metro” refers to fiber optic communications between central offices within and around cities, with distances up to a few hundred kilometers;
- “MCS” refers to Multi-Cast Switch;
- “MPEG-2” refers to the Moving Picture Experts Group standard for compressed coding of moving pictures and associated audio information;
- “Network Products and Solutions” collectively refers to all products sold by us for use in optical communications networks and a variety of other applications that are designed for use at data rates that are less than 100Gbps, including 40G, 10G and lower data rates. These products include certain passive products that do not explicitly have a data rate specification, but that are most commonly used in networks at these data rates.
- “NLW” refers to Narrow Line Width;
- “PAM” or “PAM4” refers to Pulse Amplitude Modulation or PAM with four amplitude levels;
- “PIC” refers to Photonic Integrated Circuit;

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- “PLC” refers to Planar Lightwave Circuit;
- “PON” refers to a Passive Optical Network;
- “PSM” or “PSM4” refers to Parallel Single Mode or PSM with four parallel lanes or fibers;
- “QSFP” refers to 40G and 100G Quad Small Form-factor modules that are pluggable into standard industry interfaces for switches, routers and other telecommunications equipment;
- “ROADM” refers to Reconfigurable Optical Add Drop Multiplexer;
- “Silicon Photonics” refers to Photonic Integrated Circuits manufactured using Silicon waveguides on Silicon wafers;
- “Tbps or T” refers to terabits per second. One terabit is one trillion bits.
- “U.S. GAAP” refers to generally accepted accounting principles in the United States;
- “WDM” refers to Wavelength-Division Multiplexing and is a technology that combines multiple channels onto a single fiber using different wavelengths, or colors, of light;
- “well-characterized” refers to the ability to predict the outcome of manufacturing processes based upon known statistics of various manufacturing inputs;
- “WSS” refers to Wavelength Selective Switch; and
- “ZR” refers to transmission over a reach of 80 kilometers.

Unless the context indicates otherwise, we use the terms “NeoPhotonics,” “we,” “us,” “our” and “the Company” in this Annual Report on Form 10-K to refer to NeoPhotonics Corporation and, where appropriate, its subsidiaries.

BUSINESS

Overview

We develop, manufacture and sell optoelectronic products that transmit, receive and switch high speed digital optical signals for communications networks. Our products address the highest speed over distance applications and are designed for 100G and beyond data rates, such as at 200G, 400G and 600G on a single wavelength, for telecom and hyper-scale data center or content provider networks.

Our High Speed Products for data rates of 100G and beyond comprised 86% of our revenues in 2018 and were 83% of our 2017 revenue. These Products use our Advanced Hybrid Photonic Integration technology and are the core focus of our strategy. We believe that they are an important competitive differentiator as networks for data centers and telecom carriers increasingly demand higher data rates in their operating systems.

Our High Speed Products include transceiver modules, optical components and high speed chip-level optical devices. Our 100G and beyond transceiver module products incorporate our vertically integrated, high performance components, including ultra-narrow linewidth tunable lasers (NLW-TLs), high bandwidth coherent receivers (ICRs), high bandwidth micro-modulators (micro-MOD), high bandwidth trans-impedance amplifiers (TIAs) and high bandwidth laser and modulator drivers. We integrate several of these components into a Coherent Optical Subassembly (COSA) which when combined with our NLW Laser, provides all of the optical functions necessary for coherent communications in an ultra-compact package suitable for next generations of pluggable modules. In addition to integrating these components into our own modules, we sell these components to other industry leaders who use them in their highest performance products. We believe that our strength in these and other high performance components places us in a strong competitive position as volumes grow and as we add new variants to our module product line.

100G and beyond networks have adopted coherent transmission technology to increase data rates and thereby lower costs. These high speed networks are one of the highest growth segments of the optical communications market, and support the rapid per bit expansion of telecom backbone, hyper-scale data center and content provider networks, accommodating increased mobile traffic. Prior to 2016, revenue growth from our high speed products was mainly driven by the adoption of our 100G coherent products in the Long Haul market sector. We expect our future growth in the 100G and beyond segment to be driven primarily by the increased adoption of our high speed products in the much larger Metro market sector and in the high-speed data center

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interconnect, or DCI, market as well as the optical interconnection market within large hyper-scale data centers. Products for data rates of 400G and above accounted for more than 10% of our revenue in 2018 and are among our fastest growing product groups.

Coherent transmission uses not only amplitude but also phase and polarization properties of light to increase data rates ten-fold or more over conventional “on-off” transmission protocols. Coherent transmission can flexibly and efficiently switch signals on individual wavelengths without conflict or contention between wavelengths, a feature that is required for Software Defined Optical Networks, or SDON. Software Defined Optical Networks markedly increase the flexibility and efficiency of Metro networks and, combined with the ten-fold increase in data-rates achievable with coherent transmission, mark a very large improvement in cost performance for metro scale networks. In addition, the necessary equipment to implement a metro scale network is significantly reduced, especially by using flex-coherent transceivers and CDC Switches.

The benefits of coherent transmission have made it a preferred technology for advanced high speed telecommunications networks for distances of 80 kilometers to 2000 kilometers. We believe that our Advanced Hybrid Photonic Integration technology enables us to effectively address the challenges inherent in precision and high volume manufacturing of optical components for coherent transmission.

Our products also serve high performance, non-coherent segments of the data center and enterprise market which require the fastest speeds transmitted over relatively long distances within hyper-scale data centers. We are a leading provider of electro-absorptively modulated lasers (“EMLs”), receiver photodiodes, plus laser driver and receiver amplifier ICs. In addition, we design and manufacture laser light sources in our Indium Phosphide wafer fabs for Silicon Photonics-based short reach interconnects within the data center.

Our revenue over the last several years reflects the rapid adoption and deployment of high speed 100G above networks across the global telecom and data center network applications.

Our leading customers serve the telecom market and also the hyper-scale data center market, represented by companies including Amazon, Facebook, Google and Microsoft. Large network equipment and optical module companies, together with emerging content providers and data center operators, are the focus of our strategy due to their important positions in high speed and related communications networks markets.

We sell our products to the world’s leading network equipment manufacturers, including Ciena Corporation, or Ciena, Cisco Systems, Inc., Huawei Technologies Co., Ltd., or Huawei and Nokia Corporation, or Nokia (formerly Alcatel-Lucent S.A., or Alcatel-Lucent, which was acquired by Nokia in January 2016). These four companies accounted for approximately 78% and 65% of our total revenue in 2018 and 2017, respectively. Other leading customers are FiberHome Telecommunications Technologies Co., Ltd., or FiberHome, a major Chinese telecommunications system provider, and Acacia Communications, Inc., or Acacia, a fast growing vendor of optical interconnects.

We believe our Advanced Hybrid Photonic Integration technology is well positioned to serve the highest speed next-generation 200G, 400G and 600G products and applications. Using this core technology we produce photonic integrated circuits, or PICs, that comprise both arrayed and individual photonic functional elements using optimized materials systems and processes from our in-house Silicon, Indium Phosphide and Gallium Arsenide wafer fabrication, plus Silicon Germanium and Silicon Photonics chips produced in external foundries. These individual PICs from different materials are then combined using our hybrid integration technology to make complete products, such as our Integrated Coherent Receiver (“ICR”), our ultra-narrow linewidth tunable laser, our Multi-cast Switch (“MCS”) for 100G and beyond coherent transport and Metro applications, our 100G and above CFPx transceivers for data center interconnect and telecom client networks, and our 64 Giga-baud (“GBaud”) ICR and Indium Phosphide Micro-Modulator with an integrated driver for 400G and above applications.

High Speed 100G and beyond coherent technology has become widely used in the Long Haul market segment over the last several years, but is now increasingly being deployed in the much larger Metro and the emerging data center interconnect, or DCI, sectors of the market. While the cost per port deployed typically declines every year due to technological advances, 100G and beyond coherent port demand represents a high growth opportunity for suppliers of components, modules and systems for the 100G coherent Metro and DCI markets. In addition, Metro coherent ports include ports that have “flex coherent” features, which can be used not only in the Metro market but also in the Long Haul market and therefore have to support the highest performance applications at deployment.

Our products for the rapidly growing coherent Metro market include ICR, ultra-narrow linewidth tunable lasers, CDM micro-modulators and MCS. Our multi-cast switches similarly are used by hyper-scale content providers for software definition of their network configuration. Also, we produce coherent transceiver modules that are used for the Metro market as well as the data center interconnect market, such as our high speed coherent CFP-DCO transceivers.

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We design and manufacture a range of semiconductor laser and control IC products that are used in client-side telecommunications transmission and in single mode interconnections in hyper-scale data center applications. We additionally sell laser products that are specifically optimized for use with Silicon Photonics based interconnects and for longer distance and high data rate interconnects.

We further design and manufacture a broad range of products for optical communications networks and a variety of other applications, where the networks operate at speeds less than 100G. These products are key elements of direct detect long haul and metro DWDM networks as well as mobile backhaul and fronthaul networks that include application-specific passive optical functionalities in modules or subsystem configurations. These products include athermal arrayed-waveguide grating (AWG)-based modules for multiplexing and demultiplexing in conventional ROADMs as well as variable optical attenuators and tap power monitors for network monitoring and control. In addition, many of these products provide high-bandwidth connections to base station antennas for mobile devices.

We have strengthened our technology leadership through several strategic acquisitions, listed below.

- In January 2015, we acquired the ultra-narrow linewidth tunable laser business of EMCORE Corporation's (EMCORE), expanding our position as a supplier of tunable laser for coherent communications. The EMCORE ultra narrow linewidth tunable laser products are used in the industry's highest speed applications and are critical components that are used with our highest speed and highest bandwidth receiver products for the emerging data rates of 400G and 600G.
- In March 2013, we acquired the optical component business unit of LAPIS Semiconductor Co., Ltd., located in Japan, now known as NeoPhotonics Semiconductor. This business is a leading producer of high performance communications lasers, photodiode devices and optical control electronic devices which enable our leading market positions and increasing vertical integration in our coherent products including ultra-narrow linewidth tunable lasers and coherent receivers. NeoPhotonics Semiconductor also produces high speed lasers and control semiconductors for high speed data center and client side applications, providing vertical integration for our high speed telecom client side and data center module products and stand-alone products to the industry.
- In October 2011, we acquired Santur Corporation, or Santur, a producer of tunable lasers and modulators for coherent transmission and of 100G client side transceiver modules. Santur's capabilities included array distributed feedback ("DFB") lasers and photonic integration of lasers, modulators and photodiode elements.

In December 2016, we entered into an asset purchase agreement to sell certain assets of our access and low speed transceiver product lines (the "Low Speed Transceiver Products") to APAT Optoelectronics Components Co., Ltd. ("APAT OE") of Shenzhen, China. In January 2017, we closed the sale of these assets which generated approximately 1%, 15% and 27% of our total revenue in 2017, 2016 and 2015, respectively. All of these product lines were part of our Network Products and Solutions group and include the low speed passive optical network, or PON, products for which the end-of-life plan was announced in mid-2016.

We have research and development and wafer fabrication facilities in San Jose and Fremont, California and in Tokyo, Japan that coordinate with our research and development and manufacturing facilities in Dongguan, Shenzhen and Wuhan, China and Ottawa, Canada. We use proprietary design tools and design-for-manufacturing techniques to align our design process with our precision nanoscale, vertically integrated manufacturing and testing. We believe we are one of the highest volume manufacturers of photonic integrated circuits ("PIC") in the world and that we can further expand our manufacturing capacity to meet market needs.

Industry Background

In today's hyper connected world we rely more and more on seamless access to massive amounts of data, including everything from video entertainment to tele-medicine, security sensing, autonomous vehicles and virtual reality. More and more optic data traffic is in the background between machines. This new era of connectedness is increasingly universal and demands that the capacity of the digital communications networks must increase exponentially. Smartphones and related portable devices have emerged as the preferred vehicle connecting the digital world, such that today there are more than 20 billion connected devices and machine learning and artificial intelligence will continue to accelerate this trend. Not only are more people connected to the mobile web, but they are connecting at increasingly higher data rates and requiring higher bandwidths. Wireless network deployments have progressed from third generation (3G) to fourth generation (4G/LTE) and deploying fifth generation (5G), representing a 10X increase in bandwidth over five years, and providing end-users with ever-increasing download speeds and mobility, and enabling IoT machine-to-machine communication for the integration of autonomous vehicles and virtual reality applications.

Further, the deployment of modern communications has rapidly expanded from being the domain of telecom service providers to include today's deployments by enterprises, content providers and merchant data storage and service "mega" data center enterprises. The rapid rise of internet traffic that is going through mega data centers operated primarily by leading content companies, such as Amazon, Apple, Facebook, Google and Microsoft (i.e. Microsoft Azure), has emerged as the largest part of this rapidly growing new market for optical modules and components and more specifically for high speed optical modules and components.

The revolution in the power of low cost computing devices is associated with an observation made by Intel co-founder Gordon Moore in 1965 that the number of transistors per square inch on integrated circuits had doubled every two years since their invention and a prediction that this trend would continue. In the domain of optical communications, a similar revolution, progressing at a similar rate, is driven by the increased speed, smaller size and lower cost achieved by photonic integration.

A single optical fiber can carry 100 or more individual wavelengths (colors), each of which can now support 400 gigabits per second or more of data traffic capacity. Each of these wavelengths requires a 400G or higher speed transmitter and receiver, which can be tuned to any of the 80 separate channels. Thus, using 400G coherent technology and industry standard compression (MPEG-2), a single fiber can transmit more than 30 trillion bits per second, which represents more than 8 million high definition movies streaming simultaneously.

Digital Optical Communications Market Structure

The digital optical communications market has two main sectors, telecom (which is sub divided into Long Haul, Metro and access applications) and Datacom (which includes data centers). The telecom sector includes the global backbone of Long Haul and Metro communications. It also includes local access links to end users. The Datacom and data center sector includes connections in hyper-scale data centers as well as traditional "enterprise" networks. As data centers proliferate within metropolitan sized geographies, a very rapidly growing Data Center Interconnect (DCI) market has emerged which resembles the metro market in its bandwidth and distance needs and utilizes similar optical technologies and products.

While the Metro market is the largest volume, it most often follows the Long Haul telecom sector in technology deployment, notably of coherent 100G and beyond technologies. The Long Haul telecom sector is the first adopter of the highest speed and most advanced communication links, and typically long haul technology migrates over time into the Metro sector as costs are reduced such that they are economical in the shorter but more numerous Metro network links, with its commensurate lower traffic densities prior to aggregation for Long Haul transport.

The Datacom market includes hyper-scale data centers and infrastructure for cloud based services as well as traditional enterprise networks. Companies such as Amazon, Apple, Facebook, Google and Microsoft are steadily increasing investments in very large data centers as they implement cloud-based "big data" services that can be crowd-sourced and crowd-distributed, and that utilize machine-to-machine and inter-data center transactions to power the mobile web. Connections between such very large data centers over a metro-sized area are an emerging high growth market for "big pipes" using dedicated 100G and beyond digital optical connections from data center to data center (DCI). Connections within data centers (intra-data center) and from data center to a telecommunications carrier are also moving to 100G and beyond speeds, although somewhat behind Metro, DCI and long haul. In recent years the surging demands of these hyper-scale datacenters have begun to drive communication technology developments such that the highest speed links are now often deployed first in DCI applications and only later utilized in Long Haul and Metro networks. 400Gbps is now widely deployed in DCI and systems with 600Gbps and 1.2Tbps are beginning to appear.

Connections within data centers (intra-data center) and from data center to a telecommunications carrier are also moving to 100G and beyond speeds

From this market structure, we believe that a technology leader must now achieve a leadership position in the DCI data center interconnect sector as well as the Long Haul telecom sector as the basis for commercializing the most advanced technology and then extending that technology to additional network segments.

Digital Optical Communications Network Equipment

The structure of the industry that supplies the network equipment for telecom and data center interconnect (DCI) digital optical communications networks has largely concentrated down to leading vendors which include: Ciena, Cisco, Fujitsu Networks, Fiberhome, Huawei, Infinera Corporation, NEC Corporation, Nokia (formerly Alcatel-Lucent, which was acquired by Nokia in January 2016) and ZTE Corporation.

Major suppliers of network equipment to the Datacom and data center market include Arista Networks, Cisco, Huawei, Infinera and Juniper Networks and Nokia. At the optical module and component level, Broadcom Limited, or Broadcom (resulting from the acquisition of Broadcom Corporation by Avago Technologies Ltd., or Avago), Finisar and Sumitomo Electric Device Innovations, Inc., or Sumitomo, are leading merchant suppliers and some larger network equipment companies like Huawei and Cisco have divisions or affiliates (such as HiSilicon in the case of Huawei) that are captive suppliers. Furthermore, some of the larger hyper-scale content providers, such as Google, Microsoft and Facebook, are beginning to design and source their own optical network systems equipment from contract manufacturing partners. These moves drive “disaggregation” in the data center network separating software and hardware elements, as well as different hardware functions, so that multiple vendors can supply different interacting products.

Recent changes in switch architectures are rapidly moving new installations to higher speed 100G dataflows (using PAM4, or Pulse Amplitude Modulation signal encoding), resulting in a fast growing 100G, 200G and 400G module market for connections inside the data center and “big pipes” for data connections between data centers, or data center interconnects (DCI), at 100G, 200G, 400G and 600G data rates.

The main photonic operational blocks or components required for digital optical communications are transmitters, receivers and, where the network is branched, optical switches. Transmitters and receivers are often combined into single modules which are called transceivers and can be configured into line cards, daughter cards and transponders, or digital or analog modules. At the high end, such as Long Haul, a transmitter and receiver can be paired and combined with signal processing electronics to error correct and restore degradation which affects the signal after traveling long distances, in which case the unit is referred to as a transponder. For high speeds and high bandwidth each of these product types requires photonic integration at the most advanced and complete level to deliver the required performance and functionality while being manufacturable at scale and competitive in cost.

Switching products, which switch different colors, or signal channels, down different branches of the network, have thus far been Reconfigurable Optical Add/Drop Multiplexers (ROADMs) consisting of Wavelength Selective Switches (WSSs). For 100G and above coherent networks, a new type of optical switch, the Multi-Cast Switch (MCS), has been developed and introduced to eliminate contention in 100G coherent switching. The need to eliminate contention is being driven by the move to SDON, which is important to both telecom network requirements and content provider networks. A “contentionless” architecture uses both traditional “Wavelength Selective Switches” and the new MCS, which we supply. One or more MCSs are deployed initially with each ROADM node, and then additional multicast switches are deployed over time as traffic growth demands with as many as eight MCS devices for each node, allowing networks to efficiently expand as needed. This type of switch is Colorless, Directionless and Contentionless, or CDC, and its function is optimized for 100G and beyond coherent networks.

Digital Optical Communications Technology Background

Advances in cost performance in photonic integration have followed a path that has been similar to electronic integrated circuits.

The main objectives for technology advances in electronic digital integrated circuits and in integrated optical digital devices are similar, and are based on the drive towards lower cost and higher performance with expanding scale. In integrated optics these main objectives also include higher speed, lower power, smaller or denser form factor, and lower cost.

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In both electronics and optics these objectives require ever increasing integration and miniaturization. In optics, however, we believe advanced hybrid integration is required for the highest performance products. Hybrid integration for digital optical devices incorporates multiple types of materials substrates, rather than just one, as in silicon for an electronic integrated circuit.

Complete advanced photonics integration capability requires at least three materials substrate systems: Indium Phosphide for active devices such as lasers, photodiode detectors, modulators, and amplifiers; Silicon or planar doped silicon dioxide (silica) for wave guides, filters, interferometers and other passive devices; and Gallium Arsenide or Silicon Germanium for drivers and control functions at the speeds necessary for 100G. The integration of more than one material substrate is called hybrid integration, and Advanced Hybrid Photonic Integration enables products in the 100G and beyond domain.

Advantages and Challenges of Coherent Transmission

Coherent digital optical transmission technology has increased the native capacity of a fiber optic link tenfold, versus a transmission modulation of simple on/off such as in 10G WDM networks. Coherent transmission modulation encodes information via phase and polarization, and the permutations of these variables are many times greater than on/off.

To create a detectable error-free signal in the coherent modality requires that each color (wavelength) transmitted be much purer than would be required for lower speed protocols. The primary enabler of such ultra-narrow line width (NLW), that is, an ultra-pure and stable color, is a new generation of the most advanced lasers. These NLW lasers must be paired with a new generation of receivers that decode phase and polarization through comparison with another NLW laser in a PIC-interferometer. Ultra-narrow line width lasers are built on Indium Phosphide substrates while the receivers utilize a Silicon or Indium Phosphide interferometer and Indium Phosphide or Germanium photo detectors.

These 100G and beyond coherent optical transmission devices require tighter tolerances of material thickness and other critical dimensions than do components operating at 10G. For 100G, a new generation of technologies, including faster Gallium Arsenide drivers, is required to suitably process transmission signals in both the laser transmitter and the detector and receiver. As transmission speeds move to 200G, 400G and even 600G through higher order modulation protocols and higher symbol rates, even higher performance optical components are required. We believe we have established and characterized the full range of driver, laser and detector technologies required for implementing 100G, 200G, 400G and 600G coherent systems, a capability that we believe is held by only a few companies.

Our Core Technology and Hybrid Photonic Integration Platform

We have core technology capabilities in optoelectronics that enable the high speed, high bandwidth, high performance optoelectronics products and we believe we have developed or acquired all necessary capabilities required for producing high performance Advanced Hybrid Photonic Integrated optoelectronic devices for the most stringent performance requirements and operating conditions. Our core technology leverages a unique multi-material platform that includes:

Indium Phosphide (InP): Indium Phosphide is used to produce efficient lasers, sensitive photo detectors and modulators in the wavelength window typically used for telecommunications, i.e. 1.55 micron wavelengths, as it is a direct bandgap III-V compound semiconductor material. InP is the most important material for the generation of laser signals and the detection and conversion of those signals back to electronic form.

Silicon (Silicon Photonics and Planar Lightwave Circuits): Silicon is a multi-attribute material that is efficient for electronics and versatile for integration while being very inefficient in generating or detecting light in the telecom wavelength window as it is an indirect bandgap semiconductor material. Consequently, waveguides of Silicon or doped Silicon Dioxide (silica) exhibit very low optical loss and are ideal for switching, filtering or interferometric applications and active elements including modulators and switches for full transmit and receive functions are produced using Silicon waveguides.

Gallium Arsenide (GaAs): Gallium Arsenide can operate at very high speeds and is well suited to make analog integrated circuit drivers for high speed lasers and modulators due to its high electron mobility. GaAs is a direct bandgap III-V compound semiconductor material, but unlike InP, GaAs does not lase in the telecom wavelength window.

Silicon Germanium (SiGe): Silicon Germanium is an alloy of Silicon and Germanium that is used to manufacture mixed signal and analog integrated circuits and is well suited for high speed amplifiers used in 100G systems. SiGe devices are made using standard silicon processing techniques in commercial foundries.

ASIC Development: We have applied in-house capability for customized integrated circuit design and development for specific purpose applications in high speed optical digital control and management, including certain developments in signal processing. Such products are deployed in GaAs, SiGe and silicon materials platforms.

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We have developed design, integration and manufacturing approaches and techniques to produce advanced, high speed integrated solutions leveraging each of these in-house materials technology and high speed digital optoelectronics platforms.

Hybrid Photonic Integration

Products	Indium Phosphide	Silicon/Silica	Gallium Arsenide/Silicon Germanium
COHERENT PRODUCT FAMILIES			
Integrated Coherent Receiver	✓	✓	✓
Ultra-Narrow Line Width Tunable Laser	✓	✓	
100G / 200G/ 400G DCO Digital Coherent Transceiver	✓	✓	✓
Multi-Cast Switch for 100G Coherent ROADM Node	✓	✓	
64 GBaud CDM-Coherent Driver Modulator	✓	✓	✓
32 and 64 Gbaud Coherent Optical Sub-Assembly (COSA)	✓	✓	✓
CLIENT SIDE / DATA CENTER PRODUCT FAMILIES			
26 GBaud and 53 GBaud EML Lasers/Photodiodes and Semiconductor Drivers and Trans Impedance Amplifiers	✓		✓
Continuous Wave, CWDM and DWDM DFB lasers and laser arrays	✓	✓	

Our Strategy

Key elements of our strategy include:

- *Continue innovating to develop industry-leading comprehensive technology for Advanced Hybrid Photonic Integration.* We have strengthened and expanded our technology platforms for comprehensive advanced photonic integration, in part from acquisitions and from internally funded development. We expect to continue to combine our mixed platform approach to design and produce the highest performance optical signal processing solutions.
- *Capture major customer share for the most advanced modules and components at the top suppliers of state and users of the art network equipment.* We intend to deepen our relationships with our strategic customers by increasing design wins in their systems, including Ciena, Cisco, Huawei, Infinera and Nokia, plus certain others, which are market leaders or emerging players in 100G and beyond coherent systems.
- *Offer complete optoelectronic solutions for 100G to 600G and beyond for leading edge Telecom and Datacom market segments.* We expect to continue to introduce Coherent Transmitter, Receiver and Transceiver Module products that are optimized for the highest speeds so that our product line will include each of the major types of the most advanced products.
- *Achieve growth in integrated optical applications that leverage our core technology of advanced optoelectronic products.* We intend to provide state of the art products and solutions to industry leading customers to advance our goal of achieving continuous improvement in operating performance, profitability and growth.
- *Focus on high growth segments that leverage our leadership in Advanced Hybrid Photonic Integration and that contribute to our profitable growth.* We plan to continue to develop our products and solutions to capture new

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opportunities, such as growing 400G and 600G connections in both carrier networks and within and between large data centers.

- *Extend our product line into additional segments of the network and similar or related applications that will benefit from ultra-high speed performance.* We intend to penetrate the emerging market for 100G and above connections both within and between mega-data centers. In this segment we are targeting major users and builders of data centers and data center equipment, such as Amazon, Apple, Facebook, Google and Microsoft, as they develop some of their own network equipment. We believe our technology and product line is well positioned to penetrate this market.
- *Pursue acquisitions that extend our leadership position in advanced optoelectronic integration.* We may opportunistically pursue acquisitions that we believe provide complementary technology and that can accelerate our growth and strengthen our market position.

Our Technology

We have developed expertise in the design, large-scale fabrication, high-volume module manufacturing and commercial deployment of high speed digital optics and signal processing products that are based on our Advanced Hybrid Photonic Integration products and technologies. The process of designing and manufacturing advanced optoelectronic integrated devices in high volume with predictable, well-characterized performance and low manufacturing costs is complex and multi-faceted. We have developed the technologies using multiple materials platforms for photonic integration that are required to design and manufacture complex, high-performance optoelectronic components, modules and subsystems for fiber optic networks. The basic elements of our technology are as follows:

Mixed-material platform and optoelectronic integration technology. We utilize a set of proprietary integration platforms that provide optoelectronic functionality on Silicon and other integrated compound semiconductor substrates including Indium Phosphide, Gallium Arsenide and Silicon Germanium and integrated combinations of these platforms.

We utilize micron and sub-micron scale structures of multiple, Silicon, Silicon Dioxide and Indium Phosphide waveguides to fabricate optoelectronic functional elements such as lasers, detectors, modulators, interferometers, integrated optical filters, switches and variable attenuators. We integrate these functional design elements into optoelectronic devices to achieve a desired functionality and specification that is incorporated into our products. Similarly, we use Gallium Arsenide and Silicon Germanium integration platforms for drivers, amplifiers and related high-speed electronic control functions for our integrated optoelectronic devices.

Advanced Hybrid Photonic Integration. Through precise fabrication and positioning of physical features, we can integrate numerous different optoelectronic devices, which are fabricated on separate wafers from different semiconductor and related materials, matching the material to the function to create improved performance by using the highest performance elements of each type. For example, our hybrid integration allows us to integrate active devices, such as photodiodes or lasers fabricated using Indium Phosphide, with high-performance passive devices, such as interferometers, switches, routers and filters, fabricated on Silicon, and to mate electronic amplifiers made with Silicon Germanium or drivers made with Gallium Arsenide directly to optical elements made with Silicon or Indium Phosphide.

This ability to combine specific functional elements out of optimized materials not only allows for very compact and low power components, but also through the intimate coupling of different elements, makes possible completely new functions. An example of this multi-platform architecture is found in the coherent optical communications domain where we intimately couple a passive interferometer with separate quadrature components carrying information and with photo detectors to turn a high speed optical signal into data-rich electrical signals for processing.

Optoelectronic engineering and integration. As we create complex integrated optoelectronic devices, we design and build electronic control algorithms and devices, signal processing methodologies, hardware and software routines and protocols, and device level ASICs that function to control and manage the highest performance features and capabilities of these integrated optoelectronics devices and systems. For example, our digital and analog modules are carefully characterized and controlled to extend and deliver their full operating ranges and performance features enabled by their Advanced Hybrid Photonic Integration platform.

Hardware and firmware integration. We also sell our products as modules and subsystems which contain electronic hardware and firmware controls that interface directly with our customers' systems. We design the electronic hardware and develop the firmware for control of our optical products and subsystems, and so that our optical products meet customer specifications.

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Devices, Components, Modules & Subsystems. We are vertically integrated from the design of photonic integrated devices through manufacturing in our own wafer fabs and assembly and test in our own factories. We design and manufacture modules and subsystems that combine our key products with other elements to offer customers a complete solution. We sell products at each level of product utility and can achieve the highest performance and capture the greatest value. We utilize some contract manufacturers for assembly operations where it is cost effective.

Fabrication and manufacturing processes. We have developed expertise in the technology domains relevant to high-volume fabrication and manufacturing of our optoelectronic integrated circuit products using wafer-scale processes and including the complex interaction of electro-optic, thermal-optic and mechanical micro-thermal features. Our complex manufacturing steps are analogous to many processes used in the semiconductor industry. Each integrated element is tested and characterized using our proprietary test equipment before incorporation into our products. Moreover, the ability to assemble complete optoelectronic devices, modules and systems with full control of performance and fabrication from the semiconductor and optical device level through to its optoelectronic controls to its pluggable module form factor enables delivery of the highest performance, highest scale and lowest cost solutions required by the industry.

Circuit design and design-for-manufacturing tools. We use a comprehensive set of proprietary as well as industry standard software design tools, to model relevant geometries, dimensions and thermal management for a broad range of photonic devices. With these tools, we develop products with minimal design iterations and manage precision manufacturing to a narrow range of high performance specifications.

Our Products

We develop and manufacture Transmitter Products, Receiver Products and Switch Products that are used in ultra-high speed digital optical and signal processing communications, high speed switching and provisioning. We combine our transmitter and receiver products into Transceiver modules. Our Switching Products, such as Multi-Cast Switches, are used primarily in ROADM nodes that dynamically and efficiently allocate bandwidth to adjust for fast changing traffic patterns and for provisioning software defined optical networks. Our products can be categorized into groups, including High Speed Products for 100G, 200G, 400G, 600G and beyond applications, including in coherent networks, and Network Products and Solutions, for lower speed networks and other passive telecom and instrumentation products.

High Speed Products: We produce transmitter and receiver products as well as switching products for 100G and beyond optical transmission applications over distances of 2 to 2,000 kilometers. In addition, we combine 100G and beyond transmitter and receiver products into pluggable modules for line side coherent and transmission applications. We have also integrated transmitter and receiver functions into a single integrated component called a COSA (Coherent Optical Sub Assembly), which has an ultra-small form factor designed to fit into the next generation pluggable transceivers. All of our high speed 100G and beyond products are based on our Advanced Hybrid Photonic Integration technology. This technology supports encoding 100 gigabits or more per second of information for transmitting over a single channel and decoding the information at the receiver, as well as enabling smaller, more compact and more highly integrated designs for the individual elements and integrated COSAs.

For Long Haul, Metro and DCI transport, we design and manufacture optical components for coherent systems, which manipulate light to encode ten times or more the amount of information in the same wavelength channel than is possible with traditional methods. This manipulation can only be accomplished using advanced photonic integration to intimately couple functional elements together. Our Coherent Products include Ultra-Narrow Linewidth Tunable transmit and local oscillator lasers (NLW-TL), which generate the ultra-pure wavelength, or color, necessary for coherent transmission, coherent micro-modulators which encode the information on the intensity and phase of the optical beam and Integrated Coherent Receivers (ICRs), which decode the phase and polarization encoded coherent signal.

We have introduced new pluggable coherent modules which combine our NLW-ITLA with our ICR and, in some cases with our high performance coherent modulator such as in our CFPx-DCO transceiver and transponder optical modules. The design for interoperability of each of the constituent elements of such a precise high speed device is a core capability that continues to fuel our ability to develop and deliver device and module products that achieve the highest performance available globally.

We also sell 100G products for the client side and data center applications, including 26 GBaud EMLs, laser drivers, modulator drivers and photodiode receivers for 100G and beyond client side applications.

Further, we are shipping an ultra-high-speed 53 GBaud EML and driver IC sets that enable single wavelength PAM4 100G applications and subsequently four wavelength 400G intra-data center transmission.

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For hyper-scale data center applications we have introduced a series of high power laser diode array products for short reach Silicon Photonics based 100G intra-data center interconnections which use parallel single-mode architectures, or PSM4, as well as coarse wavelength division multiplexing, or CWDM architectures. These are additionally designed for use in DR1, DR4 and FR4 Silicon Photonics-based transceivers.

We provide a proprietary switching solution for 100G coherent systems embodied in our Multi-Cast Switch (MCS) product line. Our 4x16, 8x16 and 12x16 Multi-Cast Switch modules for CDC ROADMs efficiently allocate bandwidth and signal routing in 100G and higher data rate networks. The Multi-Cast Switch provides scalable contentionless operation to achieve the highest traffic management efficiency, optimizing traffic flows in coherent transmission systems. Our MCS uses our PLC photonic integration platform and consists of a complex array of switches, waveguides, taps, crossings and other functional elements manufactured on Silicon wafers using standard semiconductor processing equipment. Our PLC technology exhibits very low loss and enables the extension of the Multi-Cast Switch to be extended to higher port count NxM configurations.

Market Sectors Served By Representative High Speed Products

Products	Long Haul	Metro	Data center
COHERENT PRODUCT FAMILIES			
Integrated Coherent Receiver	✓	✓	✓
Ultra-Narrow Line Width Tunable Laser	✓	✓	✓
32 and 64Gbaud Coherent Optical Sub-Assembly (COSA)	✓	✓	✓
100G/200G/400G - DCO Digital Coherent Transceiver	✓	✓	✓
Multi-Cast Switch for 100G Coherent ROADM Node	✓	✓	✓
64 GBaud CDM-Coherent Driver Modulator	✓	✓	✓
CLIENT SIDE / DATA CENTER PRODUCT FAMILIES			
26 GBaud/53 GBaud EML Lasers/Photodiodes and Semiconductor Drivers and Trans Impedance Amplifiers			✓
Continuous Wave, CWDM and DWDM DFB lasers and laser arrays			✓

Network Products and Solutions: We design and manufacture products for optical communications networks and a variety of other applications, where the networks operate at speeds less than 100G. We offer a wide range of application-specific passive optical functionalities in modules or sub-system configurations. These include arrayed waveguide grating based drop modules for multiplexing and demultiplexing in conventional ROADM nodes as well as variable optical attenuators and tap power monitors for network monitoring and control. We combine several of these functions together in subsystems such as our variable multiplexer, which combines up to 48 variable optical attenuators and an arrayed waveguide grating multiplexer in a single compact unit. In addition, many of these products provide high-bandwidth connections to base station antennas for mobile devices and to people and machines over fixed and wireless networks. As consumer connectivity speeds have increased through the transitions from 2G to 3G to 4G/LTE and moving to 5G, the bandwidths necessary to aggregate and connect wireless traffic into the backbone network, including Mobile BackHaul, have also increased. We offer laser drivers, modulator drivers, photodiode receivers and trans-impedance amplifiers for these applications.

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Through 2016 we also offered transceiver modules for low speed Access and Mobile Backhaul applications, including GPON and GEPON transceiver products at up to 10G data rates, plus specialty transceiver products. The Low Speed Transceiver Products' assets were sold to APAT OE in January 2017, and are no longer included among our products.

In addition to products for fiber optic communications, we also sell products for test and measurement, instrumentation, industrial and research applications.

Our Infrastructure, Intellectual Properties and Our Employees

We have product development and product sustaining engineering teams in Silicon Valley (San Jose and Fremont, California), Tokyo, Japan and Shenzhen and Wuhan, China. In our Silicon Valley and Tokyo facilities we conduct research, product development and product roadmap definitions, including for our PIC products. In our Shenzhen facilities, we conduct new product development, manufacturing and process engineering, quality control, continuous improvement and cost reduction relating to product manufacturing, assembly and test. In our Wuhan, China and Ottawa, Canada facilities we conduct new device, component and product development.

We seek to establish and maintain proprietary rights in our technology and products through the use of patents, copyrights and trade secret laws. We have filed applications for patents to protect certain of our intellectual property in the U.S. and in other countries, including Australia, Canada, Japan, Korea, Hong Kong, China, Russia, India, Taiwan and several European Union countries. As of December 31, 2018, we had approximately 541 issued patents, expiring between 2019 and 2037 covering various aspects of our technologies.

We have manufacturing operations in the U.S., Japan, China and Russia. Our wafer fabrication operations are located in our San Jose and Fremont, California facilities, as well as in our Japan facilities, and include chip design, clean room fabrication, integration and related facilities for PICs. Our manufacturing, assembly and test operations are located in our Shenzhen and Dongguan, China facilities, and in Silicon Valley, California.

As of December 31, 2018, we had 1,769 employees and non-employee contractors, of which 297 were based in the U.S., 1,316 in China, 137 in Japan, 10 in Russia and Europe and 9 in Canada.

None of our U.S. employees are represented by a labor union. Chinese law allows that all employees be members of a union that is overseen by the Chinese government. The majority of the employees in our Japanese subsidiary are also members of a union. We have not experienced employment-related work stoppages and we consider our employee relations to be good.

Our Customers

In 2018, 2017 and 2016, our five largest customers accounted for 87%, 78% and 82% of our total revenue, respectively. In 2018, customers of 10% or more revenue were Huawei, together with its affiliate HiSilicon Technologies Co. Ltd. (collectively "Huawei"), and Ciena Corporation, which accounted for 46% and 24% of our total revenue, respectively. In 2017, customers of 10% or more revenue were Huawei and Ciena Corporation, which accounted for 40% and 16% of our total revenue, respectively. In 2016, Huawei and Ciena Corporation accounted for 50% and 15% of our total revenue, respectively.

Our Sales and Marketing

We operate a sales model that focuses on alignment with our customers through coordination of our sales, product application engineering and manufacturing teams. Our sales cycles typically require a significant amount of time and a substantial expenditure of resources before we can realize revenue from the sale of products. The length of our sales cycle, from initial request to design win, is typically 6 to 12 months for an existing product and 12 to 18 months or longer for a new product.

We use a global direct sales force based in North America, Europe and Asia, including China and Japan. These individuals work with our product application engineers, and product marketing and sales operations teams, in an integrated approach to address our customers' current and future needs. We have very deep technical relationships. We believe that these collaborative engineering activities provide us insight into our customers' broader and longer-term needs. We view our technical sales capability and our technical relationships with customers as a key part of our value delivery to our key strategic customers.

Our marketing team focuses on product strategy, product development, roadmap development, new product introduction processes, program management, product demand stimulation and assessment, and competitive analysis. Our marketing team also seeks to educate the market about our products by communicating the value proposition and product differentiation in direct customer interactions and presentations and at industry tradeshows and at technical conferences. It is important that these

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teams are engaged in both industry forums such as MSA (multi supplier agreement) Committees, etc. as well as direct customer and end-user engagements.

Our Research and Development

We have invested and expect to continue to invest significant time and capital into our research and development operations. Research and development expenses were \$53.8 million, \$58.3 million and \$57.4 million in 2018, 2017 and 2016, respectively.

Our research and development activities continue to push the performance leadership boundaries in high speed digital optics, hybrid optical integration, optoelectronics control and in signal processing.

Our Suppliers

We use suppliers from the U.S., China, Japan and other locations. Although there are multiple sources for most of the component parts of our products, some components are sourced from single or, in some cases, limited sources, which can increase risks of materials availability for production. We typically do not have written agreements with the majority of these component manufacturers to guarantee the supply of the key components used in our products. We also use contract manufacturers in Japan, China and other Asia locations for the back-end manufacturing of certain of our products.

As the industry scales the entire supply chain is working to scale. As a result, we work closely with our key suppliers to understand their business as we grow together. This requires our continuing close management.

Our Backlog

Sales of our products generally are made pursuant to purchase orders, often with short lead times. These purchase orders are typically made without deposits and may be subject to revision or cancellation. The quantities actually purchased by our customers, as well as the shipment schedules, are frequently revised to reflect changes in our customers' needs and in our supply of products.

Certain of our customers use vendor managed inventory (VMI) arrangements under which we manufacture at a customer's request, then ship to its facility or a designated contract manufacturer for the customer, to be held until it is used by the customer. We maintain title to vendor managed inventory until the customer uses the inventory. At that time the customer takes title to the products, it reports the consumption to us and we recognize the revenue for the product sale. The increased use of VMI by our customers may increase the possibility of changes to our backlog since customers may consume VMI more quickly or more slowly than we had planned.

Our direct sales force works our customers in an integrated approach to understand current and future needs. Because we operate a sales model that focuses on alignment with our customers there is the possibility of changes in delivery or acceptance schedules, cancellations, modifications or price reductions with limited or no penalties and the use by customers of VMI is increasing, we do not believe that backlog is a firm or reliable indicator of our future revenue and do not rely on backlog to manage our business or evaluate our performance. Changes in the amount of our backlog do not necessarily reflect a corresponding change in the level of actual or potential sales.

Seasonality

Historically, our first quarter revenue is generally seasonally lower than the rest of the year primarily due to lower capacity utilization during the annual new year holidays in China and the impact of typical price negotiations conducted at the end of each calendar year and impacting shipments during this period. This historical pattern is important in recognizing the typical annual distribution of revenue from quarter to quarter through the year. That said, our first quarter revenue varies markedly year to year so should not be considered a reliable indicator of our future revenue or financial performance.

Financial Information by Geographic Region

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For information regarding our revenue and property, plant and equipment by geographic region, see Note 18 to the Consolidated Financial Statements. For risks relating to our operations see “Item 1A. Risk Factors” and particularly the risks under the caption “Risks related to our operations in China” and the risk factors “Our future results of operations may be subject to volatility as a result of exposure to fluctuations in foreign exchange rates, primarily the Chinese Renminbi (RMB) and Japanese Yen (JPY) exchange rates”, “We face a variety of risks associated with international sales and operations, which if not adequately managed could adversely affect our business and financial results” and “We are subject to global governmental export and import controls that could subject us to liability, impair our ability to compete in international markets or restrict our sales to certain customers.”

Competition

The market for optical communications systems is highly competitive. While no single company competes with us across all of our product areas, our competitors range from large international companies offering a wide range of products to smaller companies specializing in narrow markets. We believe the principal competitive factors in this market are:

- ability to provide leading edge technologies for high speed communications;
- ability to design and manufacture high quality, reliable products, including customized solutions;
- breadth of product solutions;
- price to performance characteristics;
- ability to quickly and consistently produce in high volume and high quality;
- ability to meet customers’ specific requirements;
- ability to meet customer lead time demands;
- financial stability; and
- depth of relationships with and proximity to key customers globally.

We believe we compete favorably with respect to these factors. We believe our principal competitors include:

- Furukawa Co., Ltd., Fujitsu Optical Components Limited, NTT Electronics Corporation, Sumitomo Electric Industries, Ltd (“SEI”), Finisar, Lumentum Holdings Inc. (formerly JDS Uniphase Corporation) and others in Coherent products;
- Accelink Technologies Co., Ltd., Broadcom (formerly Avago), Finisar, InnoLight Technology Corporation, M/A-Com, Inc, Source Photonics, Inc., Sumitomo Electric Industries and others in Data center and Client side products;
- Lumentum and NTT Electronics Corporation in switching; and
- Lumentum, NTT Electronics Corporation, M/A-Com, Inc., Sumitomo Electric Industries and others in Network Products and Solutions.

Our competitors may have substantially greater name recognition and technical, financial and marketing resources than we do. Many of our competitors have greater resources to develop products or pursue acquisitions, and more experience in developing or acquiring new products and technologies and in creating market awareness for these products and technologies than we do. In addition, a number of our competitors have the financial resources to offer competitive products at below market pricing levels that could prevent us from competing effectively and which could adversely affect our financial performance.

We also face competition from some of our customers, including Huawei and its affiliate, HiSilicon, who evaluate our capabilities against the merits of manufacturing products internally. These customers may have the ability to manufacture competitive products at a lower cost than we would charge as a result of their higher levels of integration. As a result, these customers may purchase less of our products and there would be additional pressure to lower our selling prices which, accordingly, would negatively impact our revenue and gross margin.

Environmental, Health and Safety Matters

Our research and development and manufacturing operations and our products are subject to a variety of environmental, health and safety laws and regulations in the jurisdictions in which we operate. These regulations govern, among other things, the discharge of pollutants to air, water, and soil; the remediation of soil and groundwater contamination; the use, handling and disposal of hazardous materials; employee health and safety; and the hazardous material content and recycling of our products. We use, store and dispose of hazardous materials in our manufacturing operations and as components in our products. We incur costs to comply with existing environmental, health and safety requirements, and any failure to comply, or the identification of contamination for which we are found liable, could cause us to incur additional costs, including cleanup costs, monetary fines, or civil or criminal penalties, or result in the curtailment of our operations. In addition, environmental, health and safety requirements have become more stringent over time, and changes to existing requirements could restrict our ability to expand our facilities, require us to acquire costly pollution control equipment, or cause us to incur other significant expenses or to modify our manufacturing processes or the contents of our products. Some jurisdictions in which we operate or sell our products have enacted requirements regarding the recycling of waste electronic equipment, and/or the packaging and hazardous material content of certain products. For example, jurisdictions including China and the European Union, among a growing number of jurisdictions, have placed restrictions on the use of lead, among other chemicals, in electronic products, which affects the composition and packaging of our products. The passage of such requirements in additional jurisdictions, or the tightening of standards or elimination of certain exemptions in jurisdictions where our products are already subject to such requirements, could cause us to incur significant expenditures to make our products compliant with new requirements, or could limit the markets into which we may sell our products.

Additionally, increasing efforts to control emissions of greenhouse gases, or GHG, may also impact us. For example, our semiconductor manufacturing operations in California use perfluorocarbons, which are classified as a high global warming potential greenhouse gas. Under California's Global Warming Solutions Act, we designed and installed additional pollution control equipment at our San Jose, California, manufacturing plant to reduce our perfluorocarbon emissions beginning in 2012. Since the end of 2012, our San Jose and Fremont, California, manufacturing facilities have maintained compliance with the Global Warming Solutions Act through the monitoring and reviewing of our Greenhouse Gas Emissions including permits issued locally by the Bay Area Air Quality Management District, and we have submitted reports annually to verify such compliance. In the U.S., the Environmental Protection Agency has announced a finding relating to GHG emissions that may result in promulgation of federal GHG air quality standards that could also affect us.

Available Information

We were incorporated in the State of Delaware in October 1996 as NanoGram Corporation, and we changed our name to NeoPhotonics Corporation in 2002. Our principal offices are located at 2911 Zanker Road, San Jose, CA 95134, USA and our telephone number is +1 (408) 232-9200. Our website address is www.neophotonics.com. Information found on, or accessible through, our website is not a part of, and is not incorporated into, this Annual Report on Form 10-K.

We file electronically with the U.S. Securities and Exchange Commission, or SEC, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended. We make available on our website at www.neophotonics.com, free of charge, copies of these reports as soon as reasonably practicable after filing these reports with, or furnishing them to, the SEC.

ITEM 1A. RISK FACTORS

Risks Associated with Our Business

We are dependent on Huawei Technologies Co., Ltd. and its affiliate HiSilicon Technologies Co., Ltd. for a large portion of our revenue and the loss of, or a significant reduction in, orders in any period from Huawei may reduce our revenue and adversely impact our results of operations.

In the years ended December 31, 2018, 2017 and 2016, Huawei Technologies Co. Ltd., together with its affiliate HiSilicon Technologies Co., Ltd. (collectively "Huawei") accounted for approximately 46%, 40% and 50% of our revenue, respectively. The loss of, or a significant reduction in, orders from this major customer would materially and adversely affect our revenue and results of operations.

We are subject to risks and uncertainties related to our revenue growth outlook in China.

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Fiber optics telecommunication growth in China is an important contributor to our success. We expect a major portion of our revenue to come from China infrastructure spending in wireline and wireless networks, notably from the three largest China telecom carriers, China Mobile Communications Corporation, China Telecommunications Corporation and China United Network Communications Group Co., Ltd. In part, this infrastructure spending originates from the publicly announced China Broadband 2020 and related initiatives. In 2017, slower than anticipated spending and tender awards from the China telecom carriers, reduced spending under these tender awards initiatives and excess inventory accumulated and held by our leading customers in China, adversely affected our financial condition and results of operations. While these conditions improved in 2018, if the anticipated Chinese spending and carrier tender awards do not increase as anticipated, or if there are further unanticipated and/or prolonged delays in the Chinese initiative, our business, financial condition, results of operations and prospects would be further adversely affected.

We are subject to global governmental export and import controls that could subject us to liability, impair our ability to compete in international markets, or restrict our sales to certain customers.

We are subject to export and import control laws, trade regulations and other trade requirements that limit which products we sell and where and to whom we sell our products. In some cases, it is possible that export licenses would be required from the U.S. or other government agencies outside the U.S. such as, but not limited to, Japan, China or Russia for some of our products in accordance with various statutes. In addition, various countries regulate the export or import of certain technologies and have enacted laws that could limit our ability to distribute our products. Failure to comply with these and similar laws on a timely basis, or at all, or any limitation on our ability to export or sell our products or to obtain any required licenses would adversely affect our business, financial condition and results of operations.

We have had a history of losses which may recur in the future.

We have had a history of losses and we may incur additional losses in future periods. As of December 31, 2018, our accumulated deficit was \$397.5 million. We continue to review our expenditures related to the ongoing operations of our business for their effectiveness. These include expenditures related to the sales, marketing and development of our products and to maintain our manufacturing facilities and research and development operations. Operations and assets that are deemed to be less effective may be subject to restructuring, which could lead to increased operating losses in future periods when and if restructuring charges are incurred.

Changes in U.S. and international trade policies, particularly with regard to China, may adversely impact our business and operating results.

The U.S. government has recently made statements and taken certain actions that changes U.S. trade policies, including recently-imposed tariffs affecting certain products manufactured in China. Some products manufactured by our Chinese affiliates are subject to these recently-imposed tariffs if imported into the United States. In addition, the China government has taken certain reciprocal actions, including recently imposed tariffs affecting certain products for all the United States. It is unknown whether and to what extent additional new tariffs (or other new laws or regulations) will be adopted that increase the cost of importing products to or from the United States, or from China to the United States. Further, it is unknown what effect that any such new tariffs or retaliatory actions would have on us or our industry and customers. As additional new tariffs, legislation and/or regulations are implemented, or if existing trade agreements are renegotiated or if China or other affected countries take retaliatory trade actions, such changes could have a material adverse effect on our business, financial condition, results of operations or cash flows.

Our revenue is highly concentrated among relatively few customers, with 5 customers representing the vast majority of our revenue. The loss of, or a significant reduction in orders in any period from any of our major customers may reduce our revenue and adversely impact our results of operations.

We have generated most of our revenue from a limited number of customers. In the years ending December 31, 2018, 2017 and 2016, our top five customers represented 87%, 78% and 82% of our revenue respectively. The loss of, or a significant reduction in orders from these major customers or any of our other key customers would materially and adversely affect our revenue and results of operations.

While we rely on many suppliers, there are a few which, if they stopped, decreased or delayed shipments to us, it could have an adverse effect on our business and financial results.

We depend on a limited number of suppliers for certain components and materials we have qualified to use in the manufacture of certain of our products. Some of these suppliers could disrupt our business if they stop, decrease or delay shipments or if the components they ship have quality, consistency, or business continuity issues. Some of these components and materials are available only from a sole source, or have been qualified only from a single source. We may also face component shortages if we experience increased demand for components beyond what our qualified suppliers can deliver. If we

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experience component shortages from certain key suppliers, we may be unable to meet customer demand or may have higher purchasing costs, or both. Although we engage in various actions to mitigate the impact of these shortages, any inability on our part to obtain sufficient quantities of critical components at reasonable costs could adversely affect our ability to meet demand for our products, which could cause our revenue, results of operations, or both to suffer.

Our customers generally restrict our ability to change the component parts in our modules without their approval and such changes may require repeating product qualification processes. The reliance on a sole supplier, single qualified vendor or limited number of suppliers could result in delivery and quality problems, reduced control over product pricing, reliability and performance and an inability to identify and qualify another supplier in a timely manner. Any supply deficiencies relating to the quality, quantities or timeliness of delivery of components that we use to manufacture our products could adversely affect our ability to fulfill our customer orders and our results of operations.

We may need to raise additional capital in order to pursue our business strategies or maintain our operations, and we may not be able to obtain capital when desired on favorable terms, if at all, or without dilution to our stockholders.

We believe that our existing cash and cash equivalents, and cash flows from our operating activities and funds available under our credit facilities will be sufficient to meet our anticipated cash needs for at least the next 12 months. However, we operate in an industry that makes our prospects difficult to evaluate. It is possible that we may not generate sufficient cash flow from operations or otherwise have the capital resources to meet our future capital needs. If this occurs, we may need additional financing to continue operations or execute on our current or future business strategies, including to:

- invest in our research and development efforts, including by hiring additional technical and other personnel;
- maintain and expand our operating or manufacturing infrastructure;
- acquire complementary businesses, products, services or technologies; or
- otherwise pursue our strategic plans and respond to competitive pressures.

We do not know with certainty what forms of financing, if any, will be available to us. If financing is not available on acceptable terms, if and when needed, our ability to fund our operations, enhance our research and development and sales and marketing functions, develop and enhance our products, respond to unanticipated events, including unanticipated opportunities, or otherwise respond to competitive pressures could be adversely impacted. In any such event, our business, financial position and results of operations could be materially harmed. Moreover, if we raise additional funds through the issuance of equity or convertible debt securities, the percentage ownership of our stockholders could be significantly diluted, and these newly issued securities may have rights, preferences or privileges senior to those of existing stockholders. If we fail to raise sufficient additional capital if needed, we may not be able to completely execute our business plan and may not be able to continue our operations without further reducing expenses.

If we incur additional indebtedness through arrangements such as credit agreements or term loans, such arrangements may impose restrictions and covenants that limit our ability to respond appropriately to market conditions, make capital investments or take advantage of business opportunities. In addition, any additional debt arrangements we may enter into would likely require us to make regular interest payments, which could adversely affect our results of operations.

Manufacturing problems and supply constraints could impact manufacturing yields or result in delays in product shipments to customers and could adversely affect our revenue, competitive position and reputation.

We may experience delays, disruptions or quality control problems in our manufacturing operations or supply chain constraints, which could adversely impact manufacturing volumes, yields or delay product shipments. As a result, we could incur additional costs that would adversely affect our gross margin, and product shipments to our customers could be delayed beyond the shipment schedules requested by our customers, which would negatively affect our revenue, competitive position and reputation.

Additionally, manufacturing yields depend on a number of factors, including the stability and manufacturability of the product design, manufacturing improvements gained over cumulative production volumes, the quality and consistency of component parts and the nature and extent of customization requirements by customers. Capacity constraints, raw materials shortages, logistics issues, labor shortages, volatility in utilization of manufacturing operations, supporting utility services and other manufacturing supplies, the introduction of new product lines, rapid increases in production demands and changes in customer requirements, manufacturing facilities or processes, or those of some third party contract manufacturers and suppliers of raw materials and components have historically caused, and may in the future cause, reduced manufacturing yields, negatively impacting the gross margin on, and our production capacity for, those products. Our ability to maintain sufficient

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manufacturing yields is particularly challenging with respect to PICs due to the complexity and required precision of a large number of unique manufacturing process steps. Manufacturing yields for PICs can also suffer if contaminated materials or materials that do not meet highly precise composition requirements are inadvertently utilized. Because a large portion of our PIC manufacturing costs are fixed, PIC manufacturing yields have a substantial effect on our gross margin. Lower than expected manufacturing yields could also delay product shipments and decrease our revenue.

Customer demand is difficult to accurately forecast and, as a result, we may be unable to optimally match production with customer demand.

We make planning and spending decisions based on our estimates of customer requirements. The short-term nature of commitments by many of our customers, and the possibility of unexpected changes in demand for their products, reduce our ability to accurately estimate future customer requirements. In 2016 and 2017, we incurred substantial capital expenditures to increase manufacturing capacity in response to strong customer demand in 2016 (particularly in China) and in expectation of continued strong demand in 2017. However, tender awards from the China telecom carriers and spending under the China Broadband 2020 and related initiatives was slower in 2017 than anticipated. Changes in expected worldwide and national growth rates for 2018 and 2019 could lead to increased volatility in demand, particularly from our China customers. Because many of our costs and operating expenses are relatively fixed, reduction in customer demand due to market downturns or other reasons would have a material adverse effect on our operating results, as occurred in 2017.

On the other hand, on occasion, customers may require rapid increases in production, which can strain our resources, cause our manufacturing to be negatively impacted by materials shortages, necessitate higher or more restrictive procurement commitments, increase our manufacturing yield loss and scrapping of excess materials, result in delayed shipments and/or reduce our gross margins. We may not have sufficient capacity at any given time to meet the volume demands of our customers, and we may have difficulty expanding our manufacturing operations on a timely basis to meet increasing customer demand. Additionally, one or more of our suppliers may not have sufficient capacity at any given time to meet our volume demands. Any inability to meet customer demands for rapid increases in production in the future could have a material adverse effect on our business, financial condition, results of operations and prospects.

We are under continuous pressure to reduce the prices of our products, which has adversely affected, and may continue to adversely affect, our gross margins.

The communications networks industry has been characterized by declining product prices over time as technological advances increase price and performance and put pressure on existing products. We have reduced the prices of many of our products in the past, most often during annual end-of-year price negotiation. We expect pricing pressure for our products to continue, including from our major customers. To maintain or increase their market share, our competitors also reduce prices of their products each year. In addition, our customers may seek to internally develop and manufacture competing products at a lower cost than we would otherwise charge, which would add additional pressure on us to lower our selling prices. If we are unable to offset any future reductions in our average selling prices by increasing our sales volume, reducing our costs or introducing new products, our gross margin would be adversely affected.

We depend upon outside contract manufacturers for a portion of the manufacturing process for some of our products. Our operations and revenue related to these products could be adversely affected if we encounter problems with any such contract manufacturer.

While the majority of our products are manufactured internally, we also rely upon contract manufacturers in Thailand, China, Japan and other Asia locations to provide back-end manufacturing and production of some of our products. Our reliance on contract manufacturers for some of our products makes us vulnerable to possible production capacity constraints, reduced control over their supply chains, delivery schedules, manufacturing yields, manufacturing quality/controls and costs. If one of our contract manufacturers is unable to meet all of our customer demand in a timely fashion, whether due to their direct operating control or due to their supply chain, this could have a material adverse effect on the revenue from our products.

If the Metro and data center interconnect market sectors do not grow as rapidly as we expect, or if demand for our products in these sectors is lower than we expect, our revenue growth may be adversely affected.

We expect that our future growth in the market for 100G, 400G and beyond coherent products to be driven in large part by the increased adoption of our products in the Metro market segment and in the high-performance data center interconnect market. Over the last several years, 100G and beyond coherent technology has seen increasing adoption in the Long Haul market segment and now is penetrating the much larger Metro sector of the market.

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If we fail to achieve or sustain a leadership position in the Long Haul telecom sector and use our position in that market to penetrate the Metro and data center interconnect segments, if these segments fail to grow as expected, or if demand for our products in the Metro and data center interconnect market segments fails to materialize, our business, financial condition, results of operations and prospects would suffer.

We face intense competition which could negatively impact our results of operations and market share.

The communications networks industry is highly competitive. Our competitors range from large international companies offering a wide range of products to smaller companies specializing in niche products.

Some of our competitors have substantially greater name brand recognition, technical, financial, and marketing resources, and greater manufacturing capacity, as well as better-established relationships with customers, than we do. Some of our competitors have more resources to develop or acquire, and more experience in developing or acquiring, new products and technologies. Some of our competitors may be able to develop new products more quickly than us and may be able to develop products that are more reliable or which provide more functionality than ours. In addition, some of our competitors have the financial resources to offer competitive products at below-market pricing levels that could prevent us from competing effectively and result in a loss of sales or market share or cause us to lower prices for our products.

We also face competition from some of our customers who evaluate our capabilities against the merits of manufacturing products internally, including Huawei. Due to the fact that such customers are not seeking to make a comparable profit directly from the manufacture of these products, they may have the ability to provide competitive products at a lower total cost than we would charge such customers. As a result, these customers may purchase less of our products and there would be additional pressure to lower our selling prices which, accordingly, would negatively impact our revenue and gross margin.

The Chinese Government Ministry of Industry and Information Technology has announced a five-year optical component technology roadmap with the aim to reduce China's dependency on non-domestic companies for high-end optical chips and sub-components, including some products manufactured and sold by us. This announcement continues an ongoing trend in China to build domestic industry in this area, and, while we believe local Chinese component suppliers do not currently have the capability to supply the highest performance optical chips and sub-components, those companies may over time develop such capability and negatively impact our revenue and financial performance if we do not continue to innovate and maintain our lead in the highest speed and performance optical components.

If we fail to retain our key personnel or if we fail to attract additional qualified personnel, we may not be able to achieve our anticipated growth and our business could suffer.

Our success and ability to implement our business strategy depends upon the continued contributions of our senior management team and others, including senior management in foreign subsidiaries and our technical and operations employees in all locations. Our future success depends, in part, on our ability to attract and retain key personnel, including our senior management and others. The loss of services of members of our senior management team or key personnel or the inability to continue to attract and retain qualified personnel could have a material adverse effect on our business. Competition for highly skilled technical and operations people where we operate is extremely intense, and we continue to face challenges identifying, hiring and retaining qualified personnel in many areas of our business.

The majority of our customer contracts do not commit customers to specified buying levels, and many of our customers may decrease, cancel or delay their buying levels at any time with little or no advance notice to us.

Our products are typically sold pursuant to individual purchase orders or by use of a vendor-managed inventory, or VMI, model, which is a process by which we ship agreed quantities of products to a customer-designated location and those products remain our inventory and we retain the title and risk of loss for those products until the customer takes possession of the products. Our customers are typically not contractually committed to buy any quantity of products beyond firm purchase orders. Many of our customers may increase, decrease, cancel or delay purchase orders already in place. We have experienced and expect to continue to experience wide fluctuations in demand from customers using VMI, particularly Huawei and its affiliate HiSilicon Technologies Co., Ltd., even in instances where we have built and shipped products to the customer-designated locations as VMI.

Our success will depend on our ability to anticipate and quickly respond to evolving technologies and customer requirements.

Our ability to anticipate and respond to evolving technology, industry standards, customer requirements and product offerings, and to develop and introduce new and enhanced products and technologies, will be critical factors in our ability to succeed. In addition, the introduction of new products by other companies embodying new technologies, or the emergence of

new industry standards, could render our existing products uncompetitive from a pricing standpoint, obsolete or otherwise unmarketable.

We must continually achieve new design wins and develop new products or our business and future revenue may be harmed.

The markets for our products are characterized by frequent new product introductions, changes in customer requirements and evolving industry standards, all with an underlying pressure to reduce cost and meet stringent reliability and qualification requirements. Our future performance will depend on our successful development, introduction and market acceptance of new and enhanced products that address these challenges. The anticipated or actual introduction of new and enhanced products by us and by our competitors may cause our customers to defer or cancel orders for our existing products, and could result, and in the past, has resulted, in a write-down in the value of inventory. To the extent customers defer or cancel orders for our products for any reason or we fail to achieve new design wins, our competitive position would be adversely affected and our ability to grow revenue would be impaired.

Furthermore, fast time-to-market with new products can be critical to success in our markets. It is difficult to displace an existing supplier for a particular type of product once a network equipment vendor has chosen a supplier, even if a later-to-market product provides superior performance or cost efficiency. If we are unable to make our new or enhanced products commercially available on a timely basis, we may lose existing and potential customers and our financial results would suffer.

We may be exposed to costs or losses from product lines that we intend to exit or may undertake divestiture of portions of our business that require us to continue providing substantial post-divestiture transition services and support, which may cause us to incur unanticipated costs and liabilities and adversely affect our financial condition and results of operations.

We have a strategy to exit products that have been declining in revenue and have lower gross margins than our other higher speed products. For instance, in January 2017, we completed the sale of assets and transfer of certain liabilities of our access network and low speed transceiver product lines (the “Low Speed Transceiver Products”) and in January 2019 we announced the end-of-life of certain client transceiver modules and will discontinue the manufacture and sale of those products after completing final production in May 2019. We may incur additional costs in connection with the sale or end-of-life of these products, or other products and/or facilities in the future, and our revenues and net income could be negatively affected, particularly in the short term, in connection with the end-of-life or sales of such products and/or facilities. It is also possible that we could incur continued costs or liabilities after the end-of-life process is completed, which could have a material adverse effect on our financial condition or operating results.

We are subject to the cyclical nature of the markets in which we compete and any future downturn may reduce demand for our products and revenue.

The markets in which we compete are tied to the aggregate capital expenditures of telecommunications service providers as they build out and upgrade their network infrastructure. These markets may be cyclical and characterized by rapid technological change, price erosion, evolving standards and wide fluctuations in product supply and demand. In the past, including recently to varying degrees in China, the U.S. and Europe, these markets have experienced significant downturns, often connected with, or in anticipation of, the maturation of product cycles—for both manufacturers’ and their customers’ products—or in response to over or under purchasing of inventory by our customers relative to ultimate carrier demand, and with declining general economic conditions. These downturns have been characterized by diminished product demand, production overcapacity, high inventory levels and accelerated erosion of average selling prices.

Our historical results of operations have been subject to substantial fluctuations, and we may experience substantial period-to-period fluctuations in future results of operations.

If spending for communications networks does not continue to grow as expected, our business and financial results may suffer.

Our future success as a provider of components, modules and subsystems to leading network equipment vendors depends on continued capital spending on global communications networks. Network traffic has experienced rapid growth driven primarily by bandwidth-intensive content, including cloud services, mobile video and data services, wireless 4G/LTE and 5G services, social networking, video conferencing and other multimedia. This growth is intensified by the proliferation of fixed and wireless devices that are enabling consumers to access content at increasing data rates anytime and anywhere. Our future success depends on continued demand for high-bandwidth, high-speed communications networks and the ability of network equipment vendors and carrier data center operators to fulfill this demand. In 2017, this growth slowed, primarily due to soft demand and high inventory levels in China, which adversely affected our business and financial condition in 2017. While we believe the long term prospects for growth in data traffic remain strong, our business and financial results will suffer if growth does not occur as expected.

We face a variety of risks associated with international sales and operations, which if not adequately managed could adversely affect our business and financial results.

We derive, and expect to continue to derive, a significant portion of our revenue from international sales in various markets. In addition, a major portion of our operations are based in Shenzhen and Dongguan, China and we have additional operations in Japan and Canada. Our international revenue and operations are subject to a number of material risks, including, but not limited to:

- difficulties in staffing, managing and supporting operations in more than one country;
- difficulties in enforcing agreements and collecting receivables through foreign legal systems;
- fewer legal protections for intellectual property in foreign jurisdictions;
- the need for compliance with local laws and regulations;
- foreign and U.S. taxation issues and international trade barriers;
- general economic and political conditions in the markets in which we operate;
- difficulties in obtaining any necessary governmental authorizations for the export of our products to certain foreign jurisdictions;
- imposition of export restrictions on sales to any of our major foreign customers;
- fluctuations in foreign economies and fluctuations in the value of foreign currencies and interest rates;
- trade and travel restrictions;
- outbreaks of contagious disease;
- domestic and international economic or political changes, hostilities and other disruptions; and
- difficulties and increased expenses in complying with a variety of U.S. and foreign laws, regulations and trade standards, including the Foreign Corrupt Practices Act and international labor standards. Negative developments in any of these areas in China, Japan, or other countries could result in a reduction in demand for our products, the cancellation or delay of orders already placed, difficulties in producing and delivering our products, threats to our intellectual property, difficulty in collecting receivables, higher labor costs and a higher cost of doing business.

In addition, although we maintain an anti-corruption compliance program throughout our company, violations of our compliance program may result in criminal or civil sanctions, including material monetary fines, penalties and other costs against us or our employees, and may have a material adverse effect on our business.

Failure to complete the proposed sale of our Russian manufacturing facility may affect our results of operations

In connection with our raising capital in an April 2012 private placement of common stock, we established a wholly-owned subsidiary and company operations in the Russian Federation and we committed to make substantial investments in our Russian operations over a period of several years. We are required to pay up to \$2.0 million to Joint Stock Company “RUSNANO”, or Rusnano, if we do not meet certain investment conditions towards our Russian operations by 2019.

In December 2018, we signed a definitive agreement with Rusnano to sell our 100% interest in NeoPhotonics Corporation, LLC, the subsidiary for our manufacturing operations in Russia. If we are not successful in completing our proposed business transaction with Rusnano, we could be required to write-off an additional approximately \$3.0 million of assets to close our facility there as well as pay the \$2.0 million penalty to Rusnano for not meeting the required investment conditions.

Our revenues and costs will fluctuate over time, making it difficult to predict our future results of operations.

Our revenue, gross margin and results of operations have varied significantly and are likely to continue to vary from quarter to quarter due to a number of factors, many of which are not within our control. For instance, changes in gross margin may result from various factors, such as changes in pricing, changes in our fixed costs, changes in the cost of labor, changes in the mix of our products sold, changes in the amount of product manufactured versus the amount of product sold over time, and charges for excess and obsolete inventory. In addition, our first quarter revenue is typically seasonally lower than the rest of the year primarily due to annual price negotiations with customers that occur at the end of the prior year and lower capacity utilization during the holidays in China. It is difficult for us to accurately forecast our future revenue and gross margin and plan expenses accordingly and, therefore, it is difficult for us to predict our future results of operations.

Increasing costs and other factors may adversely impact our gross margins.

We may not be able to maintain or improve our gross margins because of slow introductions of new products, pricing pressure from increased competition, failure to effectively reduce the cost of existing products, failure to improve our product mix, future macroeconomic or market volatility reducing sales volumes, changes in customer demand (including a change in product mix among different areas of our business) or other factors. Our gross margins can also be adversely affected for

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reasons including, but not limited to, fixed manufacturing costs that would not be expected to decrease in proportion to any decrease in revenues; unfavorable production yields or variances; increases in costs of input parts and materials; the timing of movements in our inventory balances; warranty costs and related returns; changes in foreign currency exchange rates; possible exposure to inventory valuation reserves; and other increases in our costs and expenses, including as a result of rising labor costs in China. Such significant increases in costs without corresponding increases in revenue would materially and adversely affect our business, our results of operations and our financial condition and our gross margins.

If our customers do not qualify our products for use, then our results of operations may suffer.

Prior to placing volume purchase orders with us, most of our customers require us to obtain their approval—called qualification in our industry—of our new and existing products, and our customers often audit our manufacturing facilities and perform other vendor evaluations during this process. The qualification process involves product sampling and reliability testing and collaboration with our product management and engineering teams in the design and manufacturing stages. If we are unable to qualify our products with customers, then our revenue would be lower than expected and we may not be able to recover the costs associated with the qualification process which would have an adverse effect on our results of operations.

In addition, due to evolving technological changes in our markets, a customer may cancel or modify a design project before we have qualified our product or begun volume manufacturing of a qualified product. It is unlikely that we would be able to recover the expenses for cancelled or unutilized custom design projects.

Potential changes in our effective tax rate could negatively affect our future results.

We are subject to income taxes in the U.S., China, Japan and other foreign jurisdictions, and our domestic and international tax liabilities are subject to the allocation of expenses in differing jurisdictions. Our tax rate is affected by changes in the mix of earnings and losses in countries with differing statutory tax rates, certain non-deductible expenses and the valuation of deferred tax assets and liabilities, including our ability to utilize our net operating losses. Increases in our effective tax rate could negatively affect our results of operations.

We may be involved in intellectual property disputes, which could divert management's attention, cause us to incur significant costs and prevent us from selling or using the challenged technology.

Participants in the markets in which we sell our products have experienced frequent litigation regarding patent and other intellectual property rights. Numerous patents in these industries are held by others, including our competitors. In addition, from time to time, we have been notified that we may be infringing certain patents or other intellectual property rights of others. Regardless of their merit, responding to such claims can be time consuming, divert management's attention and resources and may cause us to incur significant expenses. In addition, there can be no assurance that third parties will not assert infringement claims against us, whether or not such claims are valid. While we believe that our products do not infringe in any material respect upon intellectual property rights of other parties and/or meritorious defense would exist with respect to any assertions to the contrary, we cannot be certain that our products would not be found infringing the intellectual property rights of others.

In January 2010, Finisar Corporation, or Finisar, filed a complaint in the U.S. District Court for the Northern District of California against us and three other co-defendants. In the complaint, Finisar alleged infringement of certain of its U.S. patents arising from the co-defendants' respective manufacture, importation, use, sale of or offer to sell certain optical transceiver products in the U.S. In March 2010, we filed an answer to the complaint and counterclaims, asserting two claims of patent infringement and additional claims asserting that Finisar has violated state and federal competition laws and violated its obligations to license on reasonable and non-discriminatory terms. In May 2010, the Court dismissed without prejudice all co-defendants (including us) except Source Photonics, Inc., on grounds that such claims should have been asserted in four separate lawsuits, one against each co-defendant. This dismissal without prejudice does not prevent Finisar from bringing a new similar lawsuit against us. In May 2012, we and Finisar agreed to toll our respective claims until the re-filing of certain of the previously asserted claims from this dispute. As a result, Finisar is permitted to bring a new lawsuit against us if it chooses to do so, and we may bring new claims against Finisar upon seven days written notice prior to filing such claims.

Although we believe that we would have meritorious defenses to the infringement allegations and intend to defend any new similar lawsuit vigorously, there can be no assurance that we will be successful in our defense. Even if we are successful, we may incur substantial legal fees and other costs in defending the lawsuit. Further, a new lawsuit, if brought by either party, would be likely to divert the efforts and attention of our management and technical personnel, which could harm our business.

We have pursued and may continue to pursue acquisitions. Acquisitions could be difficult to integrate, divert the attention of key personnel, disrupt our business, dilute stockholder value and impair our financial results.

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As part of our business strategy, we have pursued and intend to continue to pursue acquisitions of complementary businesses, products, services or technologies that we believe could accelerate our ability to compete in our existing markets or allow us to enter new markets. Any of these transactions could be material to our financial condition and results of operations. For instance, we completed four acquisitions between 2011 and 2015.

Acquisitions involve numerous risks. The failure to successfully evaluate and execute acquisitions or otherwise adequately address such risks could result in excess costs and materially harm our business and financial results.

Acquisitions also frequently result in the recording of goodwill and other intangible assets which are subject to potential impairments which have occurred in the past and which, were they to occur in the future, could harm our financial results.

If could be discovered that our products contain defects that may cause us to incur significant costs, divert our attention, result in a loss of customers and result in product liability claims.

Our products are complex and undergo quality testing as well as formal qualification, both by our customers and by us. For various reasons, such as the occurrence of performance problems that are unforeseeable in testing or that are detected only when products age or are operated under peak stress conditions, our products may fail to perform as expected long after customer acceptance. Failures could result from faulty components or design, problems in manufacturing or other unforeseen reasons. As a result, we could incur significant costs to repair or replace defective products under warranty, particularly when such failures occur in installed systems. Any significant product failure could result in lost future sales of the affected product and other products, as well as customer relations problems and litigation, which could harm our business.

The communications networks industry has long product development cycles requiring us to incur product development costs without assurances of an acceptable investment return.

Large volumes of communications equipment and support structures are installed with considerable expenditures of funds and other resources, and long investment return period expectations. At the component supplier level, these cycles create considerable, typically multi-year, gaps between the commencement of new product development and volume purchases. Due to changing industry and customer requirements, we are constantly developing new products, including seeking to further integrate functions on PICs and developing and using new technologies in our products. These development activities necessitate significant investment of capital. Our new products often require a long time to develop because of their complexity and rigorous testing and qualification requirements. Accordingly, we and our competitors often incur significant research and development and sales and marketing costs for products that, initially, will be purchased by our customers long after much of the cost is incurred and, in some cases, may never be purchased due to changes in industry or customer requirements in the interim.

We are subject to global governmental export and import controls that could subject us to liability, impair our ability to compete in international markets, or restrict our sales to certain customers.

We are subject to export and import control laws, trade regulations and other trade requirements that limit which products we sell and where and to whom we sell our products, especially laser-dependent products. In some cases, it is possible that export licenses would be required from the U.S. or other government agencies outside the U.S. such as, but not limited to, Japan, China or Russia for some of our products in accordance with various statutes. In addition, various countries regulate the export or import of certain technologies and have enacted laws that could limit our ability to distribute our products. Failure to comply with these and similar laws on a timely basis, or at all, or any limitation on our ability to export or sell our products or to obtain any required licenses would adversely affect our business, financial condition and results of operations.

If we fail to protect our intellectual property and other proprietary rights, our business and results of operations could be materially harmed.

Our success depends to a significant degree on our ability to protect our intellectual property and other proprietary rights. We rely on a combination of patent, trademark, copyright, trade secret and unfair competition laws, as well as license agreements and other contractual provisions, to establish and protect our intellectual property and other proprietary rights. We have applied for patent registrations in the U.S. and in other foreign countries, some of which have been issued. We cannot guarantee that our pending applications will be approved by the applicable governmental authorities.

Policing unauthorized use of our technology is difficult and we cannot be certain that the steps we have taken will prevent the misappropriation, unauthorized use or other infringement of our intellectual property rights. Further, we may not be able to effectively protect our intellectual property rights from misappropriation or other infringement in foreign countries where we have not applied for patent protections, and where effective patent, trademark, trade secret and other intellectual

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property laws may be unavailable, or may not protect our proprietary rights as fully as U.S. or Japan law. Particularly, our U.S. patents do not afford any intellectual property protection in China, Japan, Canada or other Asia locations, including Russia, where we have company operations.

In the future, we may need to take legal actions to prevent third parties from infringing upon or misappropriating our intellectual property or from otherwise gaining access to our technology. Protecting and enforcing our intellectual property rights and determining their validity and scope could result in significant litigation costs and require significant time and attention from our technical and management personnel. If we fail to protect our intellectual property and other proprietary rights, or if such intellectual property and proprietary rights are infringed or misappropriated, our business, results of operations or financial condition could be materially harmed.

If we fail to obtain the right to use the intellectual property rights of others which are necessary to operate our business, and to protect their intellectual property, our business and results of operations will be adversely affected.

From time to time we may choose to, or be required to, license technology or intellectual property from third parties in connection with the development of our products. Failure to obtain a necessary third-party license required for our product offerings or to develop new products and product enhancements could adversely affect our business.

Participation in standards setting organizations may subject us to intellectual property licensing requirements or limitations that could adversely affect our business and prospects.

In the course of our participation in the development of emerging standards for some of our present and future products, we may agree to grant to all other participants a license to our patents that are essential to the practice of those standards on reasonable and non-discriminatory, or RAND, terms. If we fail to limit to whom we license our patents, or fail to limit the terms of any such licenses, we may be required to license our patents or other intellectual property to others in the future, which could limit the effectiveness of our patents against competitors.

Any potential dispute involving our products, services or technology could also include our customers using our products, which could trigger our indemnification obligations to them and result in substantial expenses to us.

In any potential dispute involving allegations that our products, services or technology infringe the intellectual property rights of third parties, our customers could also become the target of litigation. Because we often indemnify our customers for intellectual property claims made against them for products incorporating our technology, any claims against our customers could trigger indemnification obligations in some of our supply agreements, which could result in substantial expenses such as increased legal expenses, product recalls, damages for past infringement or royalties for future use.

Natural disasters, terrorist attacks or other catastrophic events could harm our operations and our financial results.

Our worldwide operations could be subject to natural disasters and other business disruptions, which could harm our future revenue and financial condition and increase our costs and expenses. For example, our corporate headquarters and wafer fabrication facility in Silicon Valley, California and our Tokyo, Japan facility are located near major earthquake fault lines, and our manufacturing facilities are located in Shenzhen and Dongguan, China, areas that are susceptible to typhoons. We are not insured against many natural disasters, including earthquakes.

Similarly, our worldwide operations could be subject to secondary effects of natural disasters, terrorist attacks or other catastrophic events. Even if our facilities are not directly affected, any of these types of events could substantially disrupt the business of our suppliers or customers, which could have a material adverse effect on us.

Rapidly changing standards and regulations could make our products obsolete, which would cause our revenue and results of operations to suffer.

We design our products to conform to regulations established by governments and to standards set by industry standards bodies worldwide, such as The American National Standards Institute, the European Telecommunications Standards Institute, the International Telecommunications Union and the Institute of Electrical and Electronics Engineers. Various industry organizations are currently considering whether and to what extent to create standards for elements used in 100Gbps and beyond systems. Because certain of our products are designed to conform to current specific industry standards, if competing or new standards emerge that are preferred by our customers, we would have to make significant expenditures to develop new products and our revenue and results of operations would suffer.

Our future results of operations may be subject to volatility as a result of exposure to fluctuations in foreign exchange rates, primarily the Chinese Renminbi (RMB) and Japanese Yen (JPY) exchange rates.

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We are exposed to foreign exchange risks. Foreign currency fluctuations may adversely affect our revenue and our costs and expenses, and hence our results of operations. A substantial portion of our business is conducted through our subsidiaries based in China, whose functional currency is the RMB and Japan, whose functional currency is the JPY. The value of the RMB against the U.S. dollar and other currencies and the value of the JPY against the U.S. dollar and other currencies fluctuate and are affected by, among other things, changes in political and economic conditions.

To the extent that transactions by our subsidiaries in China and Japan are denominated in currencies other than the RMB and JPY, we bear the risk that fluctuations in the exchange rates of the RMB and JPY in relation to other currencies could decrease our revenue or increase our costs and expenses, therefore having an adverse effect on our future results of operations.

While we generate a significant portion of our revenue in U.S. dollars, a significant portion of our cost of goods sold are in RMB and JPY. Therefore appreciation in RMB and JPY against the U.S. dollar would negatively impact our cost of goods sold upon translation to U.S. dollars.

Since July 2016, we entered into hedging transactions to reduce the short-term impact of foreign currency fluctuations. During the second half of 2018, we temporarily discontinued entering into foreign currency forward contracts. This may increase the risks to us arising from the short-term impact of foreign currency fluctuations. If we resume using hedging transactions to reduce our risks in this area, the availability and effectiveness of these hedging transactions may be limited and we may not be able to successfully hedge our exposure. In addition, our currency exchange variations may be magnified by Chinese exchange control regulations that restrict our ability to convert RMB into foreign currency.

If we fail to maintain effective internal control over financial reporting in the future, the accuracy and timing of our financial reporting may be adversely affected.

Our management is responsible for establishing and maintaining adequate internal control over our financial reporting, as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934, as amended, or the Exchange Act.

Preparing our consolidated financial statements involves a number of complex manual and automated processes, which are dependent upon individual data input or review and require significant management judgment. One or more of these elements may result in errors that may not be detected and could result in a material misstatement of our consolidated financial statements. If we fail to maintain the adequacy of our internal controls over financial reporting, our business and operating results may be harmed and we may fail to meet our financial reporting obligations. If material weaknesses in our internal control are discovered or occur, our consolidated financial statements may contain material misstatements and we could be required to restate our financial results.

Our internal control over financial reporting may not prevent or detect misstatements because of its inherent limitations, including the possibility of human error, the circumvention or overriding of controls, or fraud. Even effective internal controls can provide only reasonable assurance with respect to the preparation and fair presentation of financial statements. Any failure of our internal controls could adversely affect the results of the periodic management evaluations and annual independent registered public accounting firm attestation reports regarding the effectiveness of our internal control over financial reporting. If we cannot provide reliable financial reports or prevent fraud, our business and results of operations could be harmed, investors could lose confidence in our reported financial information, and the trading price of our stock may decline.

We may be subject to disruptions or failures in information technology systems and network infrastructures that could have a material adverse effect on our business and financial condition.

We rely on the efficient and uninterrupted operation of complex information technology systems and network infrastructures to operate our business. A disruption, infiltration or failure of our information technology systems as a result of software or hardware malfunctions, system implementations or upgrades, computer viruses, cyber-attacks, third-party security breaches, employee error, theft or misuse, malfeasance, power disruptions, natural disasters or accidents could cause breaches of data security, loss of intellectual property and critical data and the release and misappropriation of sensitive competitive information and partner, customer and employee personal data. Any of these events could harm our competitive position, result in a loss of customer confidence, cause us to incur significant costs to remedy any damages and ultimately materially adversely affect our business and financial condition.

Covenants in our borrowing arrangements may limit our flexibility in responding to business opportunities and competitive developments and increase our vulnerability to adverse economic or industry conditions.

We have lending arrangements with several financial institutions, which generally require us to maintain certain financial covenants and limit our ability to take certain actions such as incurring some kinds of additional debt, paying dividends, or engaging in certain transactions like mergers and acquisitions, investments and asset sales without the lenders' consent. These restrictions may limit our flexibility in responding to business opportunities, competitive developments and adverse economic or industry conditions. In addition, a breach of any of these covenants, or a failure to pay interest or indebtedness when due under any of our credit facilities, could result in a variety of adverse consequences, including the acceleration of our indebtedness.

We may be unable to utilize our net operating loss carryforwards to reduce our income taxes, which could adversely affect our future financial results.

As of December 31, 2018, we had net operating loss, or NOL, carryforwards for U.S. federal and state tax purposes of \$276.6 million and \$52.0 million, respectively. As these net operating losses have not been utilized and may not be utilized prior to their expiration in the future. The utilization of the NOL and tax credit carryforwards are subject to a substantial limitation imposed by Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, and similar state provisions. We recorded deferred tax assets, net of valuation allowance, for the NOL carryforwards currently available after considering the existing Section 382 limitation. If we incur an additional limitation under Section 382, then the NOL carryforwards, as disclosed, could be reduced by the impact of any future limitation that would result in existing NOL carryforwards and tax credit carryforwards expiring unutilized and increases in future tax liabilities.

In some instances, we rely on third-party sales representatives to assist in selling our products, and the failure of these representatives to perform as expected could reduce our future revenue.

Although we primarily sell our products through direct sales to systems vendors, we also sell our products to some of our customers through third-party sales representatives. Many of our third-party sales representatives also market and sell competing products from our competitors. Our third-party sales representatives may terminate their relationships with us at any time, or with short notice. Our future performance will also depend, in part, on our ability to attract additional third-party sales representatives that will be able to market and support our products effectively, especially in markets in which we have not previously distributed our products. If our third-party sales representatives fail to perform as expected or to operate their businesses effectively, our revenue and results of operations could be harmed.

We are subject to environmental, health and safety laws and regulations, which could subject us to liabilities, increase our costs, or restrict our business or operations in the future.

Our manufacturing operations and our products are subject to a variety of federal, state, local and international environmental, health and safety laws and regulations in each of the jurisdictions in which we operate or sell our products. Our failure to comply with present and future environmental, health or safety requirements, or the identification of contamination, could cause us to incur substantial costs, including cleanup costs, monetary fines, civil or criminal penalties, or curtailment of operations, which could have a material adverse effect on our business, financial condition and results of operations.

Additionally, increasing efforts to control emissions of greenhouse gases, or GHG, may also impact us. Additional climate change or GHG control requirements are under consideration at the federal level in the U.S. and in China. Additional restrictions, limits, taxes, or other controls on GHG emissions could increase our operating costs and, while it is not possible to estimate the specific impact any final GHG regulations will have on our operations, there can be no assurance that these measures will not have significant additional impact on us.

Risks Related to Our Operations in China

Our business operations conducted in China are critical to our success. A significant portion of our revenue was recognized from customers for whom we shipped products to a location in China. Additionally, a substantial portion of our net property, plant and equipment, approximately 27% as of December 31, 2018, was located in China. We expect to make further investments in China in the foreseeable future. Therefore, our business, financial condition, results of operations and prospects are to a significant degree subject to economic, political, legal, and social events and developments in China.

Adverse changes in economic and political policies in China, or Chinese laws or regulations could have a material adverse effect on business conditions and the overall economic growth of China, which could adversely affect our business.

Over the past two decades, the Chinese economy has been transitioning from a planned economy, with increased government control, to a more free market-oriented economy. Despite reforms, the government continues to exercise significant control over China's economic growth by way of the allocation of resources, control over foreign currency-denominated

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obligations and monetary policy and provision of preferential treatment to particular industries or companies. Moreover, the laws, regulations and legal requirements in China, including the laws that apply to foreign-invested enterprises are relatively new and are subject to frequent changes. The interpretation and enforcement of such laws is uncertain. Any adverse changes to these laws, regulations and legal requirements, including tax laws, or their interpretation or enforcement, or the creation of new laws or regulations relating to our business, could have a material adverse effect on our business.

Furthermore, any slowdown or economic downturn, whether actual or perceived, in China could have a material adverse effect on our business, financial condition and results of operation.

Uncertainties with respect to China's legal system could adversely affect the legal protection available to us.

Our operations in China are governed by Chinese laws and regulations. Our subsidiaries in China are generally subject to laws and regulations applicable to foreign investments in China and, in particular, laws applicable to wholly foreign-owned enterprises. China has not developed a fully-integrated legal system to fully address its transition to a more market-oriented economy, and recently-enacted laws and regulations may not sufficiently cover all aspects of economic activities in China. Uncertainties in the Chinese legal system may impede our ability to enforce the contracts we have entered into with our distributors, business partners, customers and suppliers. In addition, protections of intellectual property rights and confidentiality in China may not be as effective as in the U.S. or other countries or regions with more developed legal systems. All of these uncertainties could limit the legal protections available to us and could materially and adversely affect our business and operations.

Changes in China's international trade policies may adversely impact our business and operating results.

The China government has recently made statements and taken certain actions that change trade policies, including recently-imposed tariffs affecting products manufactured in the U.S. Certain of our products manufactured in our U.S. operations have been included in the tariffs imposed on imports into China from the United States. We expect these tariffs, as currently applied, will increase our cost of goods sold by approximately one percentage point. It is unknown if any additional such tariffs or retaliatory actions will be imposed or what impact they would have on us or our industry and customers. As new tariffs, legislation and/or regulations are implemented, or if existing trade agreements are renegotiated between China and the U.S. or other affected countries, such changes could have a material adverse effect on our business, financial condition, results of operations or cash flows.

A considerable portion of our business involves selling High Speed optical components in China and any move to local Chinese vendors for these products might adversely affect our results.

The Chinese Government Ministry of Industry and Information Technology has announced a five-year optical component technology roadmap with the aim to reduce China's dependency on non-domestic companies for high-end optical chips and sub-components, including some products manufactured and sold by us. This announcement continues an ongoing trend in China to build domestic industry in this area. While we believe local Chinese component suppliers do not currently have the capability to supply the highest performance optical chips and sub-components, those companies may over time develop such capability and negatively impact our revenue and financial performance if we do not continue to innovate and maintain our lead in the highest speed and performance optical components.

Our subsidiaries in China may be subject to restrictions on dividend payments, on making other payments to us or any other affiliated company, and on borrowing or allocating tax losses among our subsidiaries.

Current Chinese regulations permit our subsidiaries in China to pay dividends only out of their accumulated profits, if any, determined in accordance with Chinese accounting standards and regulations, which are different than U.S. accounting standards and regulations. In addition, our subsidiaries in China are required to set aside at least 10% of their respective accumulated profits each year, if any, to fund their statutory common reserves until such reserves have reached at least 50% of their respective registered capital, as well as to allocate a discretionary portion of their after-tax profits to their staff welfare and bonus fund. As of December 31, 2018, our Chinese subsidiaries' common reserves had not reached this threshold and, accordingly, these entities are required to continue funding such reserves with accumulated net profits. Accordingly, we may not be able to move our capital easily, which could harm our business.

Restrictions on currency exchange may limit our ability to receive and use our revenue and cash effectively.

Because a portion of our revenue is denominated in RMB, any restrictions on currency exchange may limit our ability to use revenue generated in RMB to fund any business activities we may have outside China or to make dividend payments in U.S. dollars. Under relevant Chinese rules and regulations, the RMB is convertible under the "current account," which includes dividends, trade and service-related foreign exchange transactions, but not under the "capital account," which includes foreign

direct investment and loans, without the prior approval of the State Administration of Foreign Exchange, or SAFE. We cannot be certain that Chinese regulatory authorities will not impose more stringent restrictions on the convertibility of the RMB, especially with respect to foreign exchange transactions. If such restrictions are imposed, our ability to adjust our capital structure or engage in foreign exchange transactions may be limited.

If the Chinese government determines that we failed to obtain approvals of, or registrations with, the requisite Chinese regulatory authority with respect to our current and past import and export of technologies, or failed to obtain the necessary licenses to file patent applications outside China for inventions made in China, we could be subject to sanctions, which could adversely affect our business.

China imposes controls on technology import and export. The term “technology import and export” is broadly defined to include, without limitation, the transfer or license of patents, software and know-how, and the provision of services in relation to technology. Depending on the nature of the relevant technology, the import and export of technology to or from China requires either approval by or registration with, the relevant Chinese governmental authorities. Additionally, the Chinese government requires the patent application for any invention made at least in part in China to be filed first in China, then undergo a government secrecy review and obtain a license before such application is filed in other countries.

If the Chinese government determines that we failed to obtain follow required procedures and obtain the appropriate license before filing a patent application outside China for an invention made at least in part in China, our China patents on such products may be invalidated, which could have a material and adverse effect on our business and operations.

China regulation of loans and direct investment by offshore holding companies to China entities may delay or prevent us from using our cash proceeds to make loans or additional capital contributions to our China subsidiaries.

From time to time, we may make loans or additional capital contributions to our China subsidiaries. We cannot assure you that we will be able to obtain these government registrations or approvals on a timely basis, if at all, with respect to our future loans or capital contributions to our China subsidiaries. If we fail to receive such registrations or approvals, our ability to capitalize our China subsidiaries may be negatively affected, which could materially and adversely affect our liquidity and ability to fund and expand our business.

Dividends paid to us by our Chinese subsidiaries may be subject to Chinese withholding tax.

The Enterprise Income Tax Law and the implementation regulations provide that a 10% withholding tax may apply to dividends payable to investors that are “non-resident enterprises,” to the extent such dividends are derived from sources within China and in the absence of any tax treaty that may reduce such withholding tax rate.

Our contractual arrangements with our subsidiaries in China may be subject to audit or challenge by the Chinese tax authorities, and a finding that our subsidiaries in China owe additional taxes could substantially reduce our net income and the value of our stockholders’ investment.

Under the applicable laws and regulations in China, arrangements and transactions among related parties may be subject to audit or challenge by the Chinese tax authorities. We would be subject to adverse tax consequences if the Chinese tax authorities were to determine that the contracts with or between our subsidiaries were not executed on an arm’s length basis, and as a result the Chinese tax authorities could require that our Chinese subsidiaries adjust their taxable income upward for Chinese tax purposes. Such an adjustment could adversely affect us by increasing our tax expenses.

We may have difficulty maintaining adequate management, legal and financial controls in China, which we are required to do in order to comply with Section 404 of the Sarbanes-Oxley Act and securities laws, and which could cause a material adverse impact on our consolidated financial statements, the trading price of our common stock and our business.

Our subsidiaries in China are generally subject to our overall obligations to maintain strong corporate governance, internal controls and computer, financial and other control systems. We may have difficulty hiring and retaining employees in China with experience and expertise relating to accounting principles generally accepted in the U.S. and U.S. public-company reporting requirements. These issues could make it more difficult for us to establish and maintain adequate internal control over our financial reporting, which could then result in errors that could cause a material misstatement of our consolidated financial statements.

We may be exposed to liabilities under the FCPA and Chinese anti-corruption laws, and any determination that we violated these laws could have a material adverse effect on our business.

We are subject to the Foreign Corrupt Practices Act of 1977, or FCPA, and other laws that prohibit improper payments or offers of payments to foreign governments and their officials and political parties by U.S. persons and issuers as defined by

the statute, for the purpose of obtaining or retaining business. We have operations, agreements with third parties and we make significant sales in China. China also strictly prohibits bribery of government officials. Our activities in China create the risk of unauthorized payments or offers of payments by our employees, consultants, sales agents or distributors, even though they may not always be subject to our control. Although we have implemented policies and procedures to discourage these practices by our employees, our existing safeguards and any future improvements may prove to be less than effective, and our employees, consultants, sales agents or distributors may engage in conduct for which we might be held responsible. Violations of the FCPA or anti-corruption laws in other countries may result in severe criminal or civil sanctions, and we may be subject to other liabilities, which could negatively affect our business, operating results and financial condition.

Risks Related to Ownership of Our Common Stock

Our stock price may be volatile due to fluctuation of our financial results from quarter-to-quarter and other factors.

Our quarterly revenue and results of operations have varied in the past and may continue to vary significantly from quarter to quarter. This variability may lead to volatility in our stock price as research analysts and investors respond to these quarterly fluctuations. These fluctuations are due to numerous factors, including:

- fluctuations in demand for our products;
- the timing, size and product mix of sales of our products;
- changes in our pricing and sales policies, particularly in the first quarter of the year, or changes in the pricing and sales policies of our competitors;
- our ability to design, manufacture and deliver products to our customers in a timely and cost-effective manner and that meet customer requirements;
- quality control, yield or other output-related problems in our manufacturing operations;
- our ability to timely obtain adequate quantities of the components used in our products;
- length and variability of the sales cycles of our products;
- unanticipated increases in costs or expenses; and
- fluctuations in foreign currency exchange rates.

The foregoing factors are difficult to forecast, and these, as well as other factors, could materially adversely affect our quarterly and annual results of operations in the future. In addition, a significant amount of our operating expenses is relatively fixed in nature due to our internal manufacturing, research and development, sales and general administrative efforts. Any failure to adjust spending quickly enough to compensate for a revenue shortfall could magnify the adverse impact of such revenue shortfall on our results of operations. Moreover, our results of operations may not meet our announced financial outlook or the expectations of research analysts or investors, in which case the price of our common stock could decrease significantly. There can be no assurance that we will be able to successfully address these risks.

The market price of our common stock could be subject to wide fluctuations in response to, among other things, the risk factors described in this section of this Annual Report on Form 10-K, and other factors beyond our control, such as fluctuations in the valuation of companies perceived by investors to be comparable to us.

The stock markets have experienced price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions, such as recessions, sovereign debt or liquidity issues, interest rate changes or international currency fluctuations, may negatively affect the market price of our common stock.

In the past, many companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation. We may become the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

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The concentration of our capital stock ownership with our principal stockholders, executive officers and directors and their affiliates may limit other stockholders' ability to influence corporate matters.

As of December 31, 2018, our executive officers and directors, and entities that are affiliated with them or that have a right to designate a director, beneficially own an aggregate of approximately 21% of our outstanding common stock. This significant concentration of share ownership may adversely affect the trading price for our common stock because investors often perceive disadvantages in owning stock in companies with controlling stockholders. Also, as a result, these stockholders, acting together, may be able to control our management and affairs and matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions.

Our charter documents and Delaware law could prevent a takeover that stockholders consider favorable and could also reduce the market price of our stock.

Our amended and restated certificate of incorporation and our amended and restated bylaws contain provisions that could delay or prevent a change in control of our company. These provisions could also make it more difficult for stockholders to elect directors and take other corporate actions. These provisions include:

- providing for a classified board of directors with staggered, three-year terms;
- not providing for cumulative voting in the election of directors;
- authorizing our board of directors to issue, without stockholder approval, preferred stock rights senior to those of common stock;
- prohibiting stockholder action by written consent;
- limiting the persons who may call special meetings of stockholders; and
- requiring advance notification of stockholder nominations and proposals.

In addition, we have been governed by the provisions of Section 203 of the Delaware General Corporate Law since the completion of our initial public offering. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding common stock, from engaging in certain business combinations without approval of substantially all of our stockholders for a certain period of time.

These and other provisions in our amended and restated certificate of incorporation, our amended and restated bylaws and under Delaware law could discourage potential takeover attempts, reduce the price that investors might be willing to pay for shares of our common stock in the future and result in the market price being lower than it would be without these provisions.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

Our properties consist primarily of owned and leased office and manufacturing facilities. Our corporate headquarters are located in San Jose, California and our manufacturing facilities are primarily located in Shenzhen and Dongguan, China and Tokyo, Japan. The following schedule presents the approximate square footage of our facilities as of December 31, 2018.

Location	Square Feet	Commitment and Use
San Jose, California	103,314	Leased; 2 buildings used for corporate headquarters offices and wafer fabrication.
Fremont, California	73,186	Leased; 2 buildings. One building used for wafer fabrication and research and development. Second building is currently not occupied and lease cost was accelerated during the restructuring in 2017.
Shenzhen, China	236,853	Owned; 1 building and 1 floor of a building. The building is used for manufacturing, research and development, and sales and marketing. The owned floor of the building, representing 23,361 square feet, was leased to a tenant effective February 2014.
Shenzhen, China	25,526	Leased; 2 buildings used for staff dormitory.
Dongguan, China	89,491	Leased; 2 buildings used for manufacturing and for staff dormitory.
Tokyo, Japan	143,875	Owned; 1 building used for manufacturing, research and development and marketing.

In addition, we lease a number of smaller offices for warehousing, manufacturing, research and other functions.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we are involved in litigation that we believe is of the type common to companies engaged in our line of business, including commercial disputes and employment issues. As of the date of this Annual Report on Form 10-K, other than as described below, we are not involved in any pending legal proceedings that we believe could have a material adverse effect on our financial condition, results of operations or cash flows. However, as described below, a certain dispute involves a claim by a third party that our activities infringe their intellectual property rights. This and other types of intellectual property rights claims generally involve the demand by a third party that we cease the manufacture, use or sale of the allegedly infringing products, processes or technologies and/or pay substantial damages or royalties for past, present and future use of the allegedly infringing intellectual property. Claims that our products or processes infringe or misappropriate any third-party intellectual property rights (including claims arising through our contractual indemnification of our customers) often involve highly complex, technical issues, the outcome of which is inherently uncertain. Moreover, from time to time, we may pursue litigation to assert our intellectual property rights. Regardless of the merit or resolution of any such litigation, complex intellectual property litigation is generally costly and diverts the efforts and attention of our management and technical personnel which could adversely affect our business.

For a discussion of our current legal proceedings, please refer to the information set forth under the “Litigation” section in Note 14, *Commitments and contingencies*, in Notes to Consolidated Financial Statements in Item 8 of Part II of this Annual Report on Form 10-K, which is incorporated herein by reference.

ITEM 4. MINE SAFETY DISCLOSURES

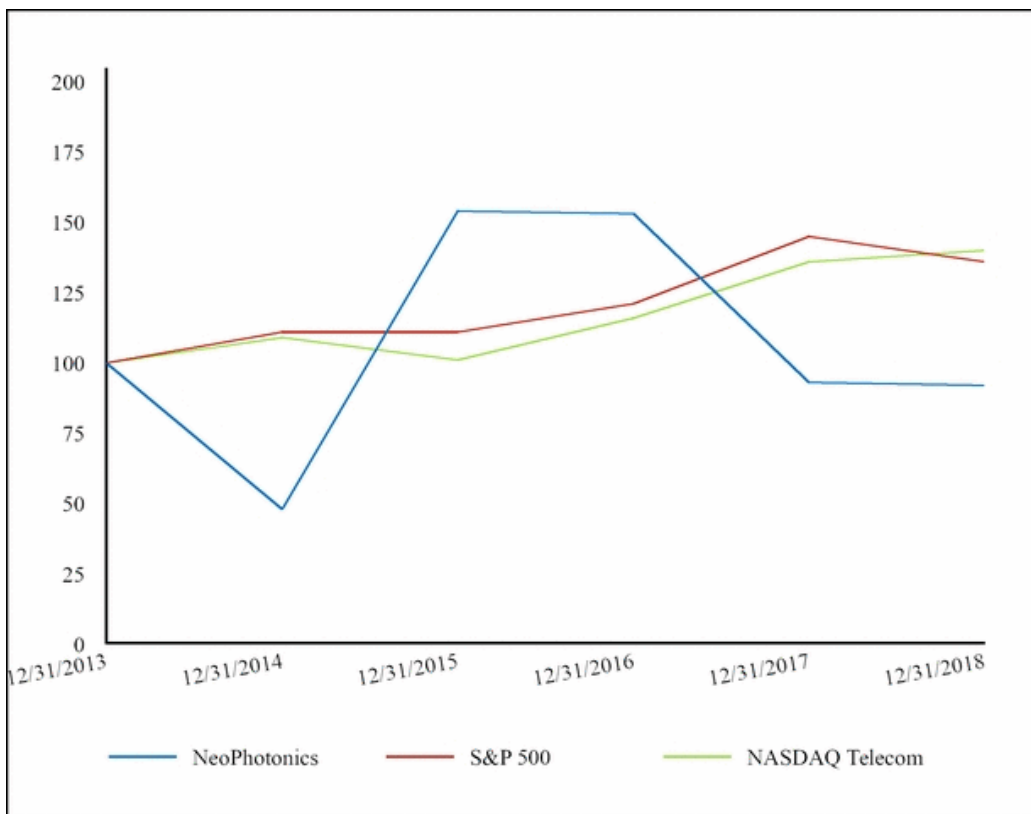
Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock trades on the New York Stock Exchange under the symbol NPTN. As of February 28, 2019, there were approximately 66 holders of record of our common stock (not including beneficial holders of our common stock held in street names).

The graph below shows the cumulative total stockholder return of an investment of \$100 (and the reinvestment of any dividends thereafter) on 12/31/2013 in (i) our common stock, (ii) the S&P 500 Index and (iii) the NASDAQ Telecommunications Index. Our stock price performance shown in the graph below is not indicative of future stock price performance. The following graph and related information shall not be deemed "soliciting material" or be deemed to be "filed" with the SEC, nor shall such information be incorporated by reference into any future filing, except to the extent that we specifically state that such graph and related information are incorporated by reference into such filing.



	NeoPhotonics	S&P 500	NASDAQ Telecom
12/31/2013	\$ 100	\$ 100	\$ 100
12/31/2014	\$ 48	\$ 111	\$ 109
12/31/2015	\$ 154	\$ 111	\$ 101
12/31/2016	\$ 153	\$ 121	\$ 116
12/31/2017	\$ 93	\$ 145	\$ 136
12/31/2018	\$ 92	\$ 136	\$ 140

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For equity compensation plan information refer to Item 12 of this Annual Report on Form 10-K.

ITEM 6. SELECTED FINANCIAL DATA

The following selected consolidated financial data should be read together with our consolidated financial statements and the related notes and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” appearing elsewhere in this Annual Report on Form 10-K. The selected consolidated financial data in this section is not intended to replace our consolidated financial statements and the related notes.

We derived the consolidated statements of operations data for the years ended December 31, 2018, 2017 and 2016 and the consolidated balance sheet data as of December 31, 2018 and 2017 from our consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K. The consolidated statements of operations data for the years ended December 31, 2015 and 2014 and the consolidated balance sheet data as of December 31, 2016, 2015 and 2014 are derived from our consolidated financial statements, which are not included in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of our future results.

Consolidated Statement of Operations Data:	Years ended December 31,				
	2018	2017	2016 ⁽¹⁾	2015 ⁽²⁾	2014 ⁽³⁾
	<i>(in thousands, except per share data)</i>				
Revenue	\$ 322,540	\$ 292,894	\$ 411,423	\$ 339,439	\$ 306,177
Cost of goods sold	256,367	231,415	294,290	240,358	235,059
Gross profit	66,173	61,479	117,133	99,081	71,118
Operating expenses	107,831	112,843	114,114	95,128	90,250
Income (loss) from operations	(41,658)	(51,364)	3,019	3,953	(19,132)
Interest and other income, net	(650)	(1,060)	373	2,819	1,932
Provision for income taxes	(1,329)	(909)	(3,597)	(3,104)	(2,519)
Net income (loss)	\$ (43,637)	\$ (53,333)	\$ (205)	\$ 3,668	\$ (19,719)
Basic net income (loss) per share ⁽⁴⁾	\$ (0.97)	\$ (1.23)	\$ —	\$ 0.10	\$ (0.61)
Diluted net income (loss) per share ⁽⁴⁾	\$ (0.97)	\$ (1.23)	\$ —	\$ 0.09	\$ (0.61)

Consolidated Balance Sheet Data:	Years ended December 31,				
	2018	2017	2016	2015	2014
	<i>(in thousands)</i>				
Cash and cash equivalents	\$ 58,185	\$ 78,906	\$ 82,500	\$ 76,088	\$ 43,035
Short-term investments	7,481	12,311	19,015	23,294	—
Restricted cash and investments	11,053	2,658	4,085	2,660	21,254
Working capital ⁽⁵⁾	116,822	110,769	124,468	151,211	102,130
Total assets	340,576	402,953	390,887	341,878	286,284
Long-term debt (including current portion)	53,351	46,561	10,962	11,519	23,336
Common stock and additional paid-in capital ⁽⁶⁾	564,838	546,064	532,484	511,852	456,271
Total equity	160,240	194,451	225,405	211,656	159,456

- (1) In 2016, our stock options and stock appreciation units with market condition were vested and we recognized approximately \$5.7 million in related stock-based compensation expense in the period.
- (2) We acquired the tunable laser product lines of EMCORE Corporation on January 2, 2015 and the optical power monitoring business of EigenLight Corporation on November 2, 2015 and the results of operations from these acquisitions are included from the date of acquisition.
- (3) In 2014, we recognized total escrow settlement gain of \$4.9 million, of which \$3.9 million pertained to certain indemnification claims by us in connection with the acquisition of Santur in 2011 and \$1.0 million pertained to our acquisition of NeoPhotonics Semiconductor in 2013.

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- (4) See Note 2 to the Consolidated Financial Statements for a description of our calculation of net income (loss) per share.
- (5) Working capital is defined as total current assets less total current liabilities.
- (6) In connection with our follow-on public offering completed in 2015, we issued 6,866,689 shares of common stock at \$7.25 per share and raised approximately \$45.6 million, net of underwriting discounts and offering costs.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis by our management of our financial condition and results of operations in conjunction with our consolidated financial statements and the accompanying notes.

The following discussion contains forward-looking statements that involve risks and uncertainties, such as statements of our plans, objectives, expectations and intentions. Our actual results could differ materially from those discussed in the forward-looking statements. Please also see the cautionary language at the beginning of Part I of this Annual Report on Form 10-K regarding forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in "Risk Factors" of this Annual Report on Form 10-K.

Business overview

We develop, manufacture and sell optoelectronic products that transmit, receive and switch high speed digital optical signals for communications networks. We sell our products to the world's leading network equipment manufacturers, including Nokia (formerly Alcatel-Lucent, which was acquired by Nokia in January 2016), Ciena Corporation, Cisco Systems, Inc., and Huawei Technologies Co., Ltd. and its affiliate HiSilicon Technologies, Ltd. (collectively "Huawei"). These companies are among our largest customers and a focus of our strategy due to their leading market positions.

We have research and development and wafer fabrication facilities in San Jose and Fremont, California and in Tokyo, Japan that coordinate with our research and development and manufacturing facilities in Dongguan, Shenzhen and Wuhan, China and Ottawa, Canada. We use proprietary design tools and design-for-manufacturing techniques to align our design process with our precision nanoscale, vertically integrated manufacturing and testing. We believe we are one of the highest volume PIC manufacturers in the world and that we can further expand our manufacturing capacity to meet market needs.

Recognizing our focus on growth in our 100Gbps ("100G") and beyond products, we align our product group reporting to "High Speed Products" which includes products designed for 100G and beyond applications and "Network Products and Solutions," which comprises all products designed for applications below 100G. In 2018 and 2017, High Speed Products represented approximately 86% and 83% of total revenue, respectively. Network Products and Solutions represented approximately 14% and 17% of total revenue, in 2018 and 2017 respectively.

In 2017, the market situation for 100G and above product deployments in China materially affected our results. Demand from our China-based customers was very strong in 2016 with our customers at that time providing optimistic forecasts for 2017 in anticipation of new tenders for provincial and metro 100G system deployments from the leading Chinese telecom carriers. However, tender awards from the China telecom carriers were slower than expected in 2017, causing demand for our products by our customers to drop significantly starting in the first quarter of 2017 and to remain at a reduced level through 2017 and into the beginning of 2018.

In September 2017, China Mobile Communications Corporation awarded tenders for new provincial deployments to Huawei, ZTE Corporation and Fiberhome. This was followed in October 2017 by the issue of tenders by China United Network Communications Group Co., Ltd., or China Unicom. Due to these and other smaller tender awards we experienced a more normalized demand environment in China beginning in the second quarter of 2018 and continuing through the rest of the year.

At the same time, through 2018 we experienced increased demand for certain of our High Speed Products that are used in metro and data center interconnect (DCI) applications in North America and Europe. DCI deployments in North America were particularly strong, and our products for these applications were shipped to contract manufacturers for our system manufacturer customers.

In 2018, our revenue increase of 10% compared to 2017 was driven primarily due to a normalization of demand in China and increased demand for High Speed Products for DCI and metro applications in North America and Europe. Our gross margin was 20.5% in the year ended December 31, 2018 compared to 21.0% in the year ended December 31, 2017. The decrease in gross margin year over year was primarily attributable to a decline in average selling prices, partially offset by lower manufacturing costs.

In 2019, we expect volume growth for our High Speed Products, although quarter-to-quarter results may show considerable variability due to customer demand fluctuations for current products as well as initial ramp-up variations on new product introductions. Similar to revenue, our gross margins may fluctuate materially depending on a variety of factors including average selling price changes, product mix, volume, manufacturing utilization and ongoing manufacturing process improvements.

Critical accounting policies and estimates

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the U.S. ("U.S. GAAP"). These principles require us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, expenses and cash flow, and related disclosure of contingent assets and liabilities. Our estimates include those related to revenue recognition, stock-based compensation expense, impairment analysis of goodwill and long-lived assets, valuation of inventory, purchased intangibles, warranty liabilities and accounting for income taxes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from these estimates. To the extent that there are material differences between these estimates and our actual results, our future financial statements will be affected.

We believe that of our significant accounting policies, which are described in Note 2 of Notes to Consolidated Financial Statements, the following accounting policies involve a greater degree of judgment and complexity. Accordingly, we believe these are the most critical to fully understand and evaluate our financial condition and results of operations.

Revenue recognition

Revenue is recognized upon transfer of control of promised products or services to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products or services. The Company generally bears all costs, risk of loss or damage and retains title to the goods up to the point of transfer of control of promised products to customer. Revenue related to the sale of consignment inventories at customer vendor managed locations is not recognized until the products are pulled from consignment inventories by customers. In instances where acceptance of the product or solutions is specified by the customer, revenue is deferred until such required acceptance criteria have been met. Shipping and handling costs are included in the cost of goods sold. The Company presents revenue net of sales taxes and any similar assessments.

Stock-based compensation expense

We grant stock options, stock appreciation units and restricted stock units to employees, directors and consultants. Stock purchase rights are granted to our employees. Stock-based awards are accounted for at fair value as of the measurement date using the Black-Scholes-Merton option-pricing model, the lattice-binominal option-pricing model or stock prices. For stock options and restricted stock units, the measurement date is the grant date and for employee stock purchase rights the measurement date is the first day of the offering period. Stock appreciation units are subject to re-measurement each reporting period.

We recognize the fair value over the period during which an employee is required to provide services in exchange for the award, known as the requisite service period (usually the vesting period) on a straight-line basis. Stock-based compensation expense includes the impact of estimated forfeitures. We estimate future forfeitures at the date of grant and revise the estimates, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Determining the appropriate fair value model and calculating the fair value of stock-based awards requires judgment, including estimating stock price volatility, forfeiture rates and expected life. If any of these assumptions, or the market price of our common shares, used in the option-pricing models change, our stock-based compensation expense could materially change our consolidated financial statements.

Business Combinations

We allocate the fair value of purchase consideration to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values. The excess of the fair value of purchase consideration over the fair values of these identifiable assets and liabilities is recorded as goodwill. When determining the fair values of assets acquired and liabilities assumed, management makes significant estimates and assumptions, especially with respect to intangible assets. Critical estimates in valuing certain intangible assets include but are not limited to future expected cash flows from customer relationships and acquired patents and developed technology; and discount rates.

Fair value estimates are based on the assumptions management believes a market participant would use in pricing the asset or liability. Such assumptions are believed to be reasonable but are inherently uncertain and unpredictable and, as a result, actual results may differ from estimates.

Amounts recorded in a business combination may change during the measurement period, which is a period not to exceed one year from the date of acquisition, as additional information about conditions existing at the acquisition date becomes available.

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Goodwill and long-lived assets

Our methodology for allocating the purchase price relating to purchase acquisitions is determined through established valuation techniques. Goodwill represents a residual value as of the acquisition date, which generally results in measuring goodwill as an excess of the purchase consideration transferred plus the fair value of any noncontrolling interest in the acquired company over the fair value of net assets acquired, including any contingent consideration.

We perform annual goodwill impairment test in the fourth fiscal quarter by reporting unit. We could be subject to additional goodwill impairment tests in the event of changes in industry and market conditions, our business and reporting structure. During the fourth quarter of fiscal 2018, we performed the first step of the two-step goodwill impairment test and a sensitivity analysis for goodwill impairment and determined that the estimated fair value substantially exceeded the carrying value of the underlying goodwill and a hypothetical 10% decline in the fair value of the reporting unit would not result in an impairment of goodwill.

We assess the impairment of long-lived assets whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss would be recognized when the sum of the future net cash flows expected to result from the use of the asset and its eventual disposition is less than its carrying amount. The estimated future cash flows are based upon, among other things, assumptions about expected future operating performance and may differ from actual cash flows. If our estimates regarding future cash flows derived from such assets were to change, we may record an impairment to the value of these assets.

Valuation of inventories

We record inventories at the lower of cost (using the first-in, first-out method) or net realizable value, after we give appropriate consideration to obsolescence and inventories in excess of anticipated future demand. In assessing the ultimate recoverability of inventories, we are required to make estimates regarding future customer demand, the timing of new product introductions, economic trends and market conditions. If the actual product demand is significantly lower than forecasted, we could be required to record additional inventory write-downs which would be charged to cost of goods sold. Obsolescence is determined from several factors, including competitiveness of product offerings, market conditions and product life cycles. Write-downs of excess and obsolete inventory are charged to cost of goods sold. At the point of the loss recognition, a new, lower cost basis for that inventory is established, and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis. If this lower-cost inventory is subsequently sold, it will result in lower costs and higher gross margin for those products. Any write-downs would have an adverse impact on our gross margin. In 2018, 2017 and 2016, inventory write-down charges were approximately \$6.1 million, \$8.3 million and \$3.0 million, respectively.

Warranty liabilities

We provide warranties to cover defects in workmanship, materials and manufacturing of our products to meet stated functionality specifications. We test products against specified functionality requirements prior to delivery, but we nevertheless from time to time experience claims under our warranty guarantees. We accrue for estimated warranty costs under those guarantees based upon historical experience, and for specific items at the time their existence is known and the amounts are determinable. We charge a provision for estimated future costs related to warranty activities to cost of goods sold based upon historical product failure rates and historical costs incurred in correcting product failures. We recorded warranty expense of \$0.4 million, \$1.3 million and \$0.1 million for each of the years ended December 31, 2018, 2017 and 2016, respectively. If we experience an increase in warranty claims compared with our historical experience, or if the cost of servicing warranty claims is greater than expected, our gross margin and profitability would be adversely affected.

Accounting for income taxes

We record income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in our consolidated financial statements or tax returns. In estimating future tax consequences, generally we consider all expected future events, other than enactments or changes in tax law or rates. We provide valuation allowances when necessary to reduce deferred tax assets to the amount expected to be realized.

We operate in various tax jurisdictions and are subject to audit by various tax authorities. We provide for tax contingencies whenever it is deemed probable that a tax asset has been impaired or a tax liability has been incurred for events such as tax claims or changes in tax laws. Tax contingencies are based upon their technical merits, relevant tax law and the specific facts and circumstances as of each reporting period. Changes in facts and circumstances could result in material changes to the amounts recorded for such tax contingencies.

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As part of the process of preparing our consolidated financial statements, we are required to estimate our taxes in each of the jurisdictions in which we operate. We estimate actual current tax exposure together with assessing temporary differences resulting from differing treatment of items, such as accruals and allowances not currently deductible for tax purposes. These differences result in deferred tax assets.

We make estimates and judgments about our future taxable income that are based on assumptions that are consistent with our plans and estimates. Should the actual amounts differ from our estimates, the amount of our valuation allowance could be materially impacted. Any adjustment to the deferred tax asset valuation allowance would be recorded in the consolidated statement of operations in the period that the adjustment is determined to be required.

Results of operations

Our business is focused on the highest speed digital optics and signal processing communications applications for telecom transport and Metro networks and for data center applications. In 2018, our High Speed Products for data rates of 100G and beyond comprised 86% of our revenues. In 2017, our High Speed Products for data rates of 100G and beyond comprised 83% of our revenues. In 2016, we entered into an Asset Purchase Agreement for the sale of assets of our Low Speed Transceiver Products within our Network Products and Solutions product group. In 2016 and 2015, the Low Speed Transceiver Products represent approximately 15% and 27% of total revenue, respectively. The asset sale was closed in January 2017.

The following table presents certain consolidated statements of operations data for the periods indicated as a percentage of total revenue:

	Years Ended December 31,		
	2018	2017	2016
Revenue	100 %	100 %	100%
Gross profit	21 %	21 %	28%
Operating expenses	33 %	39 %	27%
Income (loss) from operations	(13)%	(18)%	1%
Interest and other income (expense), net	— %	— %	—%
Income (loss) before income taxes	(13)%	(18)%	1%
Net loss	(14)%	(18)%	—%

Revenue

(in thousands, except percentages)	% Change		% Change		2016
	2018	2018 to 2017	2017	2017 to 2016	
Total revenue	\$ 322,540	10%	\$ 292,894	(29)%	\$ 411,423

We sell substantially all of our products to original equipment manufacturers, or OEMs. We price our products based on market and competitive conditions and may periodically reduce the price of our products as market and competitive conditions change and as manufacturing costs are reduced. Our sales transactions to customers are denominated primarily in U.S. dollars, with some portions in Chinese Renminbi (“RMB”) and Japanese Yen (“JPY”). Revenue is driven by the volume of shipments and may be impacted by pricing pressures. We have generated most of our revenue from a limited number of customers.

Customers accounting for more than 10% of our total revenue and revenue from our top five customers for the years ended December 31, 2018, 2017 and 2016 were as follows:

	Years Ended December 31,		
	2018	2017	2016
Percent of revenue from customers accounting for 10% or more of total revenue:			
Huawei Technologies Co., Ltd (1)	46%	40%	50%
Ciena Corporation	24%	16%	15%
Percent of revenue from top five customers	87%	78%	82%

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⁽¹⁾ Huawei's percentage of revenue included its affiliate, HiSilicon. Revenue from HiSilicon represented approximately 40%, 37% and 36% of total revenue, respectively, in 2018, 2017 and 2016.

For the years ended December 31, 2018, 2017 and 2016, our percentage of sales from our China-based subsidiaries, the majority of which were denominated in RMB, were 1%, 1% and 4%, respectively.

The following tables present share of revenue by product group and geographical region:

	Years Ended December 31,		
	2018	2017	2016
High Speed Products	86%	83%	67%
Network Products and Solutions	14%	17%	33%

	Years Ended December 31,		
	2018	2017	2016
China	58%	55%	62%
Americas	22%	18%	18%
Rest of world	20%	27%	20%

Total revenue increased by \$29.6 million, or 10%, in 2018 compared to 2017. The increase was the result of a normalization of demand in China and increased demand for High Speed Products for DCI and metro applications in North America and Europe as described further in the section entitled "Business overview" above. Changes in our geographic split are largely driven by changes in the location of our customer's contract manufacturing locations.

Total revenue decreased by \$118.5 million, or 29%, in 2017 compared to 2016. The decrease was approximately equally attributable to a reduction in demand from China telecom carrier tender awards with an inventory overhang at our Chinese customers as described further in the section entitled "Business overview" above and lower revenue that resulted from the sale of assets related to our Low Speed Transceiver Products in January 2017. Revenue generated by Low Speed Transceiver Products before the asset sale was \$1.5 million in 2017, compared to \$63.6 million in 2016.

In 2019, we expect to continue growth in revenue from our High Speed Products. We also expect that a significant portion of our revenue will continue to be derived from a limited number of customers.

Cost of goods sold and gross margin

(in thousands, except percentages)	% Change		% Change		2016
	2018	2018 to 2017	2017	2017 to 2016	
Cost of goods sold	\$ 256,367	11%	\$ 231,415	(21)%	\$ 294,290
Gross profit	\$ 66,173	8%	61,479	(48)%	117,133

	2018	2017	2016
Gross profit as a % of revenue	20.5%	21.0%	28.5%

Our cost of goods sold consists primarily of the cost to produce wafers, modules and to manufacture and test our products. Additionally, our cost of goods sold includes stock-based compensation, write-downs of excess and obsolete inventory, royalty payments, amortization of certain purchased intangible assets, depreciation, acquisition-related fair value adjustments, restructuring cost, warranty, shipping and allocated facilities costs.

In 2018, gross profit increased \$4.7 million, or 8%, to \$66 million, compared to \$61.5 million in 2017. Our gross margin percent decreased by approximately half a percentage point to 20.5% in 2018 as compared to 2017. The 0.5 percentage point decline in gross margin was attributable to approximately 3.8 percentage points from year-over-year declines in average selling prices, 0.4 percentage points of higher stock-based compensation expense and approximately 0.4 percentage points of higher royalties and customs import duties, offset by 2.3 percentage points of lower product manufacturing costs (yield improvements and lower materials costs), and 1.8 percentage points from improvements in factory utilization on higher production volumes and lower inventory write-downs and warranty costs.

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In 2017, gross profit decreased \$55.7 million, or 48%, to \$61.5 million in 2017, compared to \$117.1 million in 2016. Our gross margin percent decreased by approximately eight percentage points to 21% in 2017 as compared to 2016. Approximately 6 percentage points of the decline in gross margin was driven by under-utilization attributable to lower volumes in our manufacturing plants, approximately 1.6 percentage points of the decline was due to inventory write-downs and reserves for non-cancelable purchase orders associated with excess inventory related to the demand reductions from China based customers and higher warranty reserves related to a quality rework requirement. These production volume declines were driven by: (a) lower end customer demand and therefore the need to decrease production and reduce inventory; and (b) lower output volumes at our wafer fabrication facility in Japan due to lower yields where we had end customer demand but could not support the demand with production output. Approximately 1 percentage point of the decline was driven by restructuring costs and discontinued product inventory write-downs related to our decisions to end-of life certain products. These gross margin reductions were offset by lower intangible amortization and stock-based compensation charges in 2017 which contributed 1.4 percentage points of improvement.

We expect that our gross profit and gross margin are likely to increase in 2019 due to a variety of factors, including favorable product mix, vertical integration, reduced amortization expense for purchased intangible assets and introduction of new products. Other factors that can affect our gross margin include production volume, inventory changes, changes in the average selling prices of our products, changes in the cost and volumes of materials purchased from our suppliers, changes in labor costs, changes in overhead costs or requirements, revaluation of stock appreciation unit awards that are impacted by our stock price, write-downs of excess and obsolete inventories and warranty costs. In addition, we periodically negotiate pricing with certain customers which can cause our gross margins to fluctuate, particularly in the quarters subsequent to the periods in which the negotiations occurred.

Operating expenses

(in thousands, except percentages)	% Change		% Change		2016
	2018	2018 to 2017	2017	2017 to 2016	
Research and development	\$ 53,818	(8)%	\$ 58,287	2%	\$ 57,376
Sales and marketing	16,728	(6)%	17,760	(4)%	18,595
General and administrative	30,403	(12)%	34,453	—	34,409
Amortization of purchase intangible assets	475	1%	472	(71)%	1,609
Acquisition and asset sale related costs	427	228%	130	(94)%	2,125
Loss (gain) on asset sale	200	(109)%	(2,193)	—%	—
Restructuring charges	3,135	(20)%	3,934	—%	—
Litigation settlement	2,645	100%	—	—%	—
Total operating expenses	\$ 107,831	(4)%	\$ 112,843	(1)%	\$ 114,114

Research and development

We focus our research and development effort primarily on the high speed market. Research and development expense decreased \$4.5 million, or 8%, in 2018 compared to 2017. The decrease was primarily due to a \$2.8 million decrease in development expenses, a \$1.8 million decrease in payroll and related expenses and a \$1.4 million decrease in outside development services. These decreases were partially offset by a \$1.1 million increase in stock-based compensation expense compared to 2017.

Research and development expense increased \$0.9 million, or 2%, in 2017 compared to 2016. The increase was primarily due to a \$2.7 million increase in payroll and related expenses, a \$1.2 million increase in facilities-related cost and \$0.8 million increase in depreciation expense. These increases were partially offset by a \$2.3 million decrease in stock-based compensation expense compared to the 2016, which included higher stock-based compensation relating to a higher market price of our stock and the accelerated vesting of our market-based stock awards and a \$1.3 million decrease in variable compensation.

We believe that investments in research and development are important to help meet our strategic objectives. In 2019, we plan to continue to invest in research and development activities, including new products that we believe will further enhance our competitive position. Research and development expense consists of personnel costs, including stock-based compensation, for our research and development personnel, and product development costs, including engineering services, development software and hardware tools, depreciation of equipment and facility costs. We record all research and development expense as

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incurred. As a percentage of total revenue, our research and development expense may vary as our investment and revenue levels change over time.

Sales and marketing

Sales and marketing expense decreased by \$1.0 million, or 6%, in 2018 compared to 2017, primarily due to a \$1.7 million decrease in payroll and related expenses and \$1.0 million decrease from the recovery of bad debts previously written off. These decreases were partially offset by a \$1.6 million increase in stock-based compensation expense compared to 2017.

Sales and marketing expense decreased by \$0.8 million, or 4%, in 2017 compared to 2016, primarily due to a \$2.4 million decrease in stock-based compensation expense compared to the 2016, which included higher stock-based compensation relating to a higher market price of our stock and the accelerated vesting of our market-based stock awards, and a \$1.1 decrease in commissions and other variable compensation. These decreases were partially offset by a \$0.6 million provision for bad debt expense in 2017, a \$1.4 million increase in salaries and related expenses and a \$0.3 million increase in product promotion costs.

We expect to continue to expand our high speed market focus and increase sales coverage of DCI market while controlling our sales and marketing expenses in 2019, even as our business continues to expand geographically. Sales and marketing expense consists primarily of personnel costs, including stock-based compensation and sales commissions, costs related to sales and marketing programs and services and facility costs. As a percentage of total revenue, our sales and marketing expense may vary as our revenue changes over time.

General and administrative

General and administrative expense consists of personnel costs, including stock-based compensation, for our finance, human resources and information technology personnel and certain executive officers, as well as professional services costs related to accounting, tax, banking, legal and information technology services, depreciation and facility costs.

General and administrative expense decreased by \$4.1 million, or 12%, in 2018 compared to 2017, primarily due to a \$3.7 million decrease in professional services related to accounting, tax and legal, a \$2.3 million decrease in facilities-related cost and a \$0.7 million decrease in payroll and related expenses. These decreases were partially offset by a \$1.8 million increase in stock-based compensation expense and a \$0.4 million increase in city/local taxes compared to 2017.

General and administrative expense was flat in 2017 as compared to 2016. Increases included a \$1.8 million increase in audit and accounting related fees and a \$1.5 million increase in professional and legal expenses. These increases were offset by a \$2.1 million decrease in stock-based compensation expense compared to the 2016, which included higher stock-based compensation relating to a higher market price of our stock and the accelerated vesting of our market-based stock awards and \$1.5 million decrease in variable compensation.

We expect to continue to focus on controlling our general and administrative expense in 2019. As a percentage of total revenue, our general and administrative expense may vary as our revenue changes over time.

Amortization of purchased intangible assets

Our intangible assets are being amortized over their estimated useful lives. Amortization expense relating to technology and patents and leasehold interests are included within cost of goods sold, while customer relationships and non-compete agreements are recorded within operating expenses.

In 2018, amortization of purchased intangible assets was \$1.2 million, comprising of \$0.7 million in cost of goods sold and \$0.5 million in operating expenses.

In 2017, amortization of purchased intangible assets was \$1.3 million, comprising of \$0.8 million in cost of goods sold and \$0.5 million in operating expenses. Amortization of purchased intangible assets decreased by approximately \$3.2 million in 2017 compared to 2016, primarily due to certain intangible assets being fully amortized in 2016.

Acquisition and asset sale related costs

In 2018, we incurred \$0.4 million in acquisition and asset sale related transaction costs related to legal, accounting and other professional services.

In 2017, we incurred \$0.1 million in acquisition and asset sale related transaction costs related to legal, accounting and other professional services.

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In 2016, we incurred \$2.1 million in acquisition and asset sale related transaction costs related to legal, accounting and other professional services for our acquisition and asset sale activities.

Restructuring charges

We initiated restructuring actions in order to focus on key growth initiatives and to move towards a lower break even revenue level in the prior year. Actions to lower operating expenses and manufacturing costs included a reduction in force, facilities consolidation and certain asset-related adjustments. We recorded \$0.2 million and \$3.1 million in restructuring charges within cost of goods sold and operating expenses in 2018, respectively. Restructuring charges in 2018 primarily included \$1.6 million related to changes in the fair value of penalty payment derivative, \$1.0 million related to asset impairment charges and \$0.6 million related to employee severance.

In 2017, we initiated restructuring actions in order to focus on key growth initiatives and to achieve a lower break even revenue level through lower operating expenses and manufacturing costs. Actions included a reduction in force, facilities consolidation and certain asset-related adjustments. We recorded \$0.8 million and \$3.9 million in restructuring charges within cost of goods sold and operating expenses in 2017, respectively. Additionally, we recorded a charge of \$2.0 million to cost of goods sold in 2017 for discontinued product inventory write-downs related our decisions to end-of-life certain products.

Litigation settlement

In September 2018, the Company and Cisco signed a settlement agreement under which the Company agreed to pay Cisco \$0.3 million in cash and \$0.15 million in product credits to be applied during calendar year 2019.

In January 2019, the Company and Lestina International Ltd. signed a settlement agreement under which the Company agreed to pay Lestina International Ltd. \$2.2 million in cash. We recorded this settlement amount of \$2.2 million in litigation settlement in 2018. See Note 14 of Notes to Consolidated Financial Statements in Item 8 of Part II of this Report.

Interest and other income (expense), net

(in thousands, except percentages)	% Change		% Change		2016
	2018	2018 to 2017	2017	2017 to 2016	
Interest and other income (expense), net	\$ (650)	(39)%	\$ (1,060)	(384)%	\$ 373

Interest and other income (expense), net consists of interest income, interest expense and other income, net. Interest income consists of income earned on our cash, cash equivalents and short-term investments. Interest expense consists of amounts incurred for interest on our outstanding debt. Other income, net includes foreign currency transaction gains and losses along with government subsidies. The functional currency of our subsidiaries in China and Japan is the RMB and the JPY, respectively.

Interest expense included in interest and other income (expense), increased in 2018 as compared to 2017. The increase in interest expense was due to increase in outstanding borrowings during 2018.

Interest expense included in interest and other income (expense), increased in 2017 as compared to 2016. The increase in interest expense was due to increase in outstanding borrowings during 2017.

Income taxes and effective tax rates

(in thousands, except percentages)	Years ended December 31,		
	2018	2017	2016
Provision for income taxes	\$ (1,329)	\$ (909)	\$ (3,597)
Effective tax rate	(3)%	(2)%	106%

In 2018, our income tax provision was primarily related to the operating profit realized in our foreign subsidiaries in Japan and China. Historically, we have experienced net losses in the U.S. and in the short term, we expect this trend to continue.

The effective tax rate was (3)% in 2018 as compared to (2)% in 2017 mainly due to higher earnings in foreign jurisdictions and decrease in net loss generated in the U.S. in 2018.

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The effective tax rate was (2)% in 2017 as compared to 106% in 2016 mainly due to lower earnings in foreign jurisdictions and increase in net loss generated in the U.S. in 2017.

On December 22, 2017, the Tax Cuts and Jobs Act (the "TCJA") was enacted which, among other things, lowered the U.S. federal corporate income tax rate from 35% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and creates Global Intangible Low Taxed Income ("GILTI") to tax certain foreign sourced earnings. As of December 31, 2018, the Company has concluded the accounting under the TCJA within the time period set forth in SAB 118. There was no provision impact of TCJA on the 2018 consolidated financial statements due to full valuation allowance on US deferred tax assets. In addition, the Company has elected to treat GILTI inclusion accounting impact as a current period expense.

Liquidity and capital resources

As of December 31, 2018, we had working capital of \$116.8 million, including total cash, cash equivalents, short-term investments and restricted cash of \$76.7 million. Approximately 27% of our total cash, cash equivalents, short-term investments and restricted cash were held by our foreign entities, including approximately \$17.8 million in accounts held by our subsidiaries in China, of which \$11.0 million was in restricted cash, and approximately \$2.2 million in accounts held by our subsidiary in Japan. Cash, cash equivalents, investments and restricted cash held outside of the U.S. may be subject to taxes if repatriated and may not be immediately available for our working capital needs.

Approximately \$9.0 million of our retained earnings within our total accumulated deficit as of December 31, 2018 was subject to restrictions due to the fact that our subsidiaries in China are required to set aside at least 10% of their respective accumulated profits each year end to fund statutory common reserves as well as allocate a discretionary portion of their after-tax profits to their staff welfare and bonus fund. This restricted amount is not distributable as cash dividends except in the event of liquidation.

In January 2017, we completed the sale of certain Low Speed Transceiver Products' assets for approximately \$25.0 million in consideration plus approximately \$1.4 million for a post-closing transition services arrangement. The consideration was reduced by \$3.4 million for inventory adjustment after closing to approximately \$21.6 million, which was subject to other adjustments of up to \$10.0 million for any potential claims. See Note 10 in Notes to Consolidated Financial Statements in Item 8 of Part II of this Report.

In September 2017 we entered into a revolving line of credit agreement with Wells Fargo Bank, National Association ("Wells Fargo") as the administrative agent for a lender group (the "Wells Fargo Credit Facility" or "Credit Facility"), and the \$20.0 million amount outstanding under our Comerica Bank Credit Facility, which has since been terminated, was paid in full.

The Wells Fargo Credit Facility provides for borrowings equal to the lower of (a) a maximum revolver amount of \$50.0 million, or (b) an amount equal to 80% - 85% of eligible accounts receivable plus 100% of qualified cash balances up to \$15.0 million, less certain discretionary adjustments ("Borrowing Base"). The maximum revolver amount may be increased by up to \$25.0 million, subject to certain conditions. At closing, \$50.0 million was available, of which \$30.0 million was drawn. We used \$20.0 million of this amount to pay the principal and interest due under the Comerica Bank Credit Facility.

The Credit Facility matures on June 30, 2022 and borrowings bear interest at an interest rate option of either (a) the LIBOR rate, plus an applicable margin ranging from 1.50% to 1.75% per annum, or (b) the prime lending rate, plus an applicable margin ranging from 0.50% to 0.75% per annum. We are also required to pay a commitment fee equal to 0.25% of the unused portion of the Credit Facility.

The Credit Facility agreement requires prepayment of the borrowings to the extent the outstanding balance is greater than the lesser of (a) the most recently calculated Borrowing Base, or (b) the maximum revolver amount. The Borrowing Base calculation contains a customary provision that gives the lender the ability to reduce the Borrowing Base by reserves that are subjectively determinable, which is considered a subjective acceleration clause. We are required to maintain a combination of certain defined cash balances and unused borrowing capacity under the Credit Facility of at least \$20.0 million, of which at least \$5.0 million must be unused borrowing capacity. Borrowings under the Credit Facility are collateralized by substantially all of our assets. We were in compliance with the covenants of this Credit Facility as of December 31, 2018. As of December 31, 2018, the outstanding balance under the Credit Facility was \$36.0 million and the weighted average rate under the LIBOR option was 4.41%. The remaining borrowing capacity was \$14.0 million of which \$5.0 million is required to be maintained as unused borrowing capacity.

We regularly issue short-term notes payable to our suppliers in China in exchange for accounts payable. These notes are supported by non-interest bearing bank acceptance drafts and are due three to six months after issuance. As a condition of the notes payable arrangements, we are required to keep a compensating balance at the issuing banks that is a percentage of the

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total notes payable balance until the amounts are settled. As of December 31, 2018, our subsidiary in China had two line of credit facilities with banking institutions.

As of December 31, 2018 and December 31, 2017, the non-interest bearing bank acceptance drafts issued in connection with our notes payable to our suppliers in China under these line of credit facilities had an outstanding balance of \$4.8 million and \$1.6 million, respectively. Compensating balances relating to these credit facilities totaled \$2.6 million and \$0.5 million, respectively, as of December 31, 2018 and December 31, 2017. Compensating balances are classified as restricted cash on our consolidated balance sheets. See Note 4 and Note 12 of Notes to Consolidated Financial Statements in Item 8 of Part II of this Report.

As of December 31, 2018, we had two loan arrangements with MUFG Bank, Ltd. (collectively the "Mitsubishi Bank Term Loans") and a third loan arrangement with the MUFG Bank, Ltd. and The Yamanashi Chou Bank, Ltd. One of Mitsubishi Bank Term Loans requires equal monthly payments of principal equal to 8,333,000 JPY until the maturity date of February 25, 2025, with a lump sum payment of the balance of 8,373,000 JPY on the maturity date. Interest on this loan accrues and is paid monthly based upon the annual rate of the monthly Tokyo Interbank Offer Rate (TIBOR) plus 1.40% and is secured by real estate collateral. The second term loan of 690 million JPY (approximately \$6.3 million) (the "2017 Mitsubishi Bank Loan") was entered into in March 2017 to acquire manufacturing equipment for our Japanese subsidiary and has an annual interest rate of the monthly TIBOR rate plus 1.00%. The 2017 Mitsubishi Bank Loan requires monthly interest and principal payments over 72 months commencing in April 2018. This loan was available from March 31, 2017 to March 30, 2018 and 690 million JPY (approximately \$6.3 million) under this loan was fully drawn in March 2017. In January 2018, the Company entered into a term loan agreement with MUFG Bank, Ltd. and The Yamanashi Chou Bank, Ltd. for a term loan in the aggregate principal amount of 850 million JPY (approximately \$7.7 million) (the "Mitsubishi-Yamanashi Term Loan"). The Mitsubishi-Yamanashi Term Loan was available from January 29, 2018 to January 29, 2025. The full amount of the Mitsubishi-Yamanashi Term Loan was drawn on January 29, 2018. Interest on the Mitsubishi-Yamanashi Term Loan is based upon the annual rate of the three months TIBOR rate plus 1.00%. The Mitsubishi-Yamanashi Term Loan requires quarterly interest payments, along with the principal payments, over 82 months commencing in April 2018. As of December 31, 2018, our aggregate outstanding principal balance under Mitsubishi Bank Term Loans and Mitsubishi-Yamanashi Term Loan was 2.0 billion JPY (approximately \$18.0 million). See Note 12 of Notes to Consolidated Financial Statements in Item 8 of Part II of this Report.

From time to time we accept notes receivable in exchange for accounts receivable from certain of our customers in China. These notes receivable are non-interest bearing and are generally due within nine months. Historically, we have collected on the notes receivable in full at the time of maturity.

In 2018, we generated operating losses of \$41.7 million and cash flows from operations of \$19.6 million. We had an accumulated deficit of \$397.5 million as of December 31, 2018. Through 2017 and the early part of 2018, the Company's operating results and cash flows were negatively affected by demand that was lower than customer estimates that were used to put capacity in place in 2016 and 2017. In the second half of 2018, demand continued to strengthen, primarily due to volume growth in the Americas as a result of metro and, particularly, data center interconnect deployments, as well as being the result of increased domestic provincial deployments in China plus exports by Chinese OEMs for international deployments. To adjust to the demand that was less than estimates used for capacity decisions, the Company implemented restructuring plans in May and September 2017 that included a reduction in force and consolidation of facilities, in order to reduce expenses. The Company has also reduced or delayed certain product development projects and capital expenditures, aggressively pursued collections of accounts and notes receivable and continued to closely manage production and inventory levels.

As of December 31, 2018, the remaining borrowing capacity under our revolving line of credit agreement with Wells Fargo, was \$14.0 million of which \$5.0 million is required to be maintained as unused borrowing capacity. In January 2019, we repaid \$5.0 million to Wells Fargo, which was included in long-term debt as of December 31, 2018. Additionally, we had \$4.8 million of notes payable and \$2.9 million of current portion of long-term debt as of December 31, 2018, which we plan to pay out of our existing available cash.

In China, when there is a case pending in judicial court, banks may choose to limit borrowing against existing credit lines, regardless of the legitimacy of the case. We have a dispute pending with APAT OE in judicial court (See Note 14 of Notes to Consolidated Financial Statements in Item 8 of Part II of this Report). We do not expect to make any additional draws against our credit facilities in China until this matter is resolved. We have less expensive cash and credit lines available in the U.S., and believe this will not impact our operations in China.

We believe we will have sufficient resources to fund our currently planned operations and expenditures over the next twelve months without additional financing or other actions. In addition, we believe there are a number of ongoing and potential actions that may further strengthen our projected cash and projected financial position.

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We operate in an industry in which it is difficult to evaluate our prospects with certainty. Future declines in China market demand or other changes to our forecasts could adversely affect our results of operations, financial position and cash flows. As a result, we may need to raise additional debt or equity capital to fund our operations. Any additional debt arrangements may likely require regular interest or principal payments which could adversely affect our operations. There can be no assurance that additional debt or equity capital will be available on acceptable terms, or at all.

Rusnano Rights Agreement

Under our amended rights agreement, dated June 30, 2015, with Rusnano, one of our principal stockholders, we agreed to a \$30.0 million investment commitment (the “Investment Commitment”) toward our Russian operations. The Investment Commitment can be partially satisfied by cash and/or non-cash investment inside or outside of Russia. Our \$21.0 million investment milestone for 2016 was met as of December 31, 2016. If certain of the Investment Commitments are not achieved in the indicated time frames through 2019, we have the ability to exit our Russian operations by paying an exit fee of up to \$2.0 million. See Note 14, *Commitments and contingencies*, in Notes to the Consolidated Financial Statements in Item 8 of Part II of this Report.

In December 2018, we signed a definitive agreement with Rusnano to sell our 100% interest in NeoPhotonics Corporation, LLC, the subsidiary for our manufacturing operations in Russia, for approximately book value. The purchase price to be paid by Rusnano will consist of approximately \$3.0 million in cash and \$1.0 million in cancellation of the remaining penalty payment that would otherwise be owed to Rusnano as consideration for the Company's obligations to provide manufacturing process transition to NeoPhotonics Corporation, LLC. See Note 14, *Commitments and contingencies*, in Notes to the Consolidated Financial Statements in Item 8 of Part II of this Report.

Cash flow discussion

The table below sets forth selected cash flow data for the periods presented:

(in thousands)	Years ended December 31,		
	2018	2017	2016
Net cash provided by (used in) operating activities	\$ 19,595	\$ (32,767)	\$ 53,836
Net cash used in investing activities	(11,781)	(17,314)	(47,813)
Net cash (used in) provided by financing activities	(19,460)	43,102	3,516
Effect of exchange rates on cash, cash equivalents and restricted cash	(680)	1,958	(1,702)
Net increase (decrease) in cash, cash equivalents and restricted cash	\$ (12,326)	\$ (5,021)	\$ 7,837

Operating activities

In 2018, net cash provided by operating activities was \$19.6 million, compared to \$32.8 million net cash used in operating activities in 2017. The increase was primarily attributable to a \$15.2 million increase in cash flows related to lower net loss and non-cash adjustments, \$29.7 million increase in cash flows related to decreased inventories, \$19.6 million increase in cash flows related to prepaid expenses and other assets and \$9.5 million increase in cash flows related to accounts payable. The increases were partially offset by a \$21.0 million decrease in cash flows from accounts receivable.

In 2017, net cash used in operating activities was \$32.8 million, compared to \$53.8 million net cash provided by operating activities in 2016. The decrease was primarily attributable to a \$48.3 million decrease in cash flows related to net loss and non-cash adjustments, \$34.0 million decrease in cash flows related to decreased accounts payable, \$21.0 million decrease in cash flows related to a buildup in inventories in the first half of 2017. The decreases were partially offset by a \$10.7 million increase in cash flows from collection of accounts receivable primarily driven by lower revenue and strong collections and a \$6.2 million increase in cash flows from accrued and other liabilities primarily relating to the TSA with APAT OE payable in the current year.

Investing activities

In 2018, net cash used in investing activities was \$11.8 million, a \$5.5 million decrease compared to \$17.3 million used in 2017. The decrease in net cash used in investment activities was primarily attributable to \$32.5 million decrease in property, plant and equipment purchases in 2018, partially offset by \$21.6 million in proceeds from the sale of our Low Speed Transceiver Products' assets in January 2017 and \$3.4 million due to increase in payments for settlement of foreign currency hedges in 2018.

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In 2017, net cash used in investing activities was \$17.3 million, a \$30.5 million decrease compared to \$47.8 million used in 2016. The decrease in net cash used in investment activities was primarily attributable to a \$21.6 million in proceeds from the sale of our Low Speed Transceiver Products' assets in January 2017 and a \$4.3 million decrease in property, plant and equipment purchases in 2017.

Financing activities

In 2018, net cash used in financing activities was \$19.5 million, a \$62.6 million decrease compared to \$43.1 million net cash provided by financing activities in 2017. The decrease in cash flows from investing activities was primarily attributable to \$64.7 million decrease in net borrowings under our credit facilities, terms loans and note payables in China, partially offset by a \$1.2 million increase in proceeds from government grants.

In 2017, net cash provided by financing activities was \$43.1 million, a \$39.6 million increase compared to \$3.5 million in 2016. The increase was primarily attributable to \$30.0 million in new borrowing under our Wells Fargo Credit Facility (\$10.0 million net of repayment of \$20.0 million owed under the Comerica Bank Credit Facility), and \$34.0 million from notes payable to banks in China.

Contractual obligations and commitments

The following summarizes our contractual obligations as of December 31, 2018:

(in thousands)	Payments due by period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Notes payable and short-term borrowing ⁽¹⁾	\$ 4,795	\$ 4,795	\$ —	\$ —	\$ —
Long-term debt ⁽²⁾	53,953	3,058	6,116	42,077	2,702
Retirement obligations ⁽³⁾	4,308	188	1,139	295	2,686
Operating leases ⁽⁴⁾	27,332	3,618	6,172	6,105	11,437
Purchase commitments ⁽⁵⁾	50,854	50,854	—	—	—
Rusnano payment derivative ⁽⁶⁾	2,000	2,000	—	—	—
Asset retirement obligations ⁽⁶⁾	3,391	—	10	—	3,381
Expected interest payments ⁽⁶⁾	5,568	1,585	3,057	907	19
Capital lease	424	106	212	106	—
Total	152,625	\$ 66,204	\$ 16,706	\$ 49,490	\$ 20,225
Uncertainty in timing of future payments:					
Restricted retained earnings	9,005				
Deferred compensation plan	478				
Total commitments	\$ 162,108				

- (1) See Note 12, *Debt*, in Notes to Consolidated Financial Statements in Item 8 of Part II of this Report for additional information regarding our debt.
- (2) See Note 13, *Pension Plans*, in Notes to Consolidated Financial Statements in Item 8 of Part II of this Report for additional information regarding our retirement obligations.
- (3) We have entered into various non-cancelable operating lease agreements for our offices in China, U.S. and Canada.
- (4) This is an estimate of the amount outstanding under open purchase orders for the purchase of inventory and other goods at December 31, 2018. Certain of these open purchase orders may be cancellable without penalty.
- (5) See Note 14, *Commitments and contingencies*, in Notes to Consolidated Financial Statements in Item 8 of Part II of this Report for additional information regarding our Rusnano Payment Derivative.
- (6) We have an asset retirement obligation of \$3.3 million associated with our facility lease in California which is included in other noncurrent liabilities in the consolidated balance sheet as of December 31, 2018. We also have a \$0.1 million asset retirement obligation in Japan.

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(7) We calculate the expected interest payments based on our long-term debt at prevailing interest rates as of December 31, 2018.

Uncertain Tax Positions

As of December 31, 2018, the liability for uncertain tax positions was \$0.1 million. We cannot conclude on the timing of cash payments associated with our uncertain tax positions.

Rusnano Rights Agreement

In connection with our April 2012 common stock private placement transaction, we entered into a rights agreement with Rusnano. Refer to the discussion in the “Liquidity and Capital Resources – Rusnano Rights Agreement” section.

Off-balance sheet arrangements

During the years ended December 31, 2018 and 2017, we did not have any significant off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K.

Recent accounting pronouncements

See Note 2, *Summary of Significant Accounting Policies*, in Notes to the Consolidated Financial Statements in Item 8 of Part II of this Report, for a full description of recent accounting pronouncements, including the expected dates of adoption and estimated effects on financial condition and results of operations, which is incorporated herein by reference.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest rate fluctuation risk

The primary objective of our investment activities is to preserve principal while at the same time maximizing the income we receive from our investments without significantly increasing risk. To achieve this objective, we invest our excess cash in a variety of securities, including U.S. government agency securities, corporate notes and bonds and money market funds meeting certain criteria. These securities are classified as available-for-sale which are recorded on the balance sheet at fair value. We have determined that the gross unrealized gains or losses on the available-for-sale securities at December 31, 2017 are temporary in nature. We may sell these marketable securities investments in the future to fund future operating needs.

As of December 31, 2018, we had \$4.8 million outstanding under our China credit facilities, \$36.0 million outstanding under our U.S. credit facilities and \$18.0 million outstanding under our term loans in Japan, which were subject to fluctuations in interest rates. For the year ended December 31, 2018, a hypothetical 10% increase in the interest rate could result in \$0.2 million additional annual interest expense. The hypothetical assumptions made above will be different from what actually occurs in the future. Furthermore, the computations do not anticipate actions that may be taken by our management should the hypothetical market changes actually occur over time. As a result, actual impacts on our results of operations in the future will differ from those quantified above.

Foreign currency exchange risk

Foreign currency exchange rates are subject to fluctuation and may cause us to recognize transaction gains and losses in our statements of operations. A large portion of our business is conducted through our subsidiaries in China, whose functional currency is the RMB and Japan, whose functional currency is the JPY. To the extent that transactions by these subsidiaries are in currencies other than their functional currencies, we bear the risk that fluctuations in the exchange rates of the RMB and JPY in relation to other currencies could increase our costs and expenses. During the year ended December 31, 2018, we recognized net foreign currency transaction gain of \$1.4 million. We use the U.S. dollar as the reporting currency for our consolidated financial statements. Any significant revaluation of the RMB or JPY may materially and adversely affect our results of operations upon translation of these subsidiaries' financial statements into U.S. dollars. While we generate a significant portion of our revenue in U.S. dollars, a significant portion of our cost of goods sold are in RMB. Therefore appreciation in RMB against the U.S. dollar would negatively impact our cost of goods sold upon translation to U.S. dollars. For example, for the year ended December 31, 2018, a 10% appreciation in RMB against the U.S. dollar would have resulted in an approximately \$1.5 million increase in our cost of goods sold.

Effective July 1, 2016, we have entered into hedging transactions to reduce the short-term impact of foreign currency fluctuations. During the second half of 2018, we temporarily discontinued entering into foreign currency forward contracts. This may increase the risks to us arising from the short-term impact of foreign currency fluctuations. In addition, our currency

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exchange variations may be magnified by any Chinese exchange control regulations that restrict our ability to convert RMB into foreign currency.

Inflation risk

Inflationary factors, such as increases in our cost of goods sold and operating expenses, may adversely affect our results of operations. Although we do not believe that inflation has had a material impact on our financial position or results of operations to date, an increase in the rate of inflation in the future, particularly in China, may have an adverse effect on our levels of gross profit and operating profit as a percentage of revenue if the sales prices for our products do not proportionately increase with these increased expenses.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of NeoPhotonics Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of NeoPhotonics Corporation and subsidiaries (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2018, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 7, 2019, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ DELOITTE & TOUCHE LLP

San Jose, California
March 7, 2019

We have served as the Company's auditor since 2014.

NEOPHOTONICS CORPORATION
CONSOLIDATED BALANCE SHEETS

(In thousands, except par data)	December 31,	
	2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 58,185	\$ 78,906
Short-term investments	7,481	12,311
Restricted cash	11,053	2,658
Accounts receivable, net of allowance for doubtful accounts	74,751	67,229
Inventories	52,159	67,301
Assets held for sale	2,971	—
Prepaid expenses and other current assets	26,605	36,235
Total current assets	233,205	264,640
Property, plant and equipment, net	100,090	127,565
Purchased intangible assets, net	3,018	4,294
Goodwill	1,115	1,115
Other long-term assets	3,148	5,339
Total assets	\$ 340,576	\$ 402,953
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 58,403	\$ 69,017
Notes payable and short-term borrowing	4,795	35,607
Current portion of long-term debt	2,897	6,005
Accrued and other current liabilities	50,288	43,242
Total current liabilities	116,383	153,871
Long-term debt, net of current portion	50,454	40,556
Other noncurrent liabilities	13,499	14,075
Total liabilities	180,336	208,502
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Preferred stock, \$0.0025 par value, 10,000 shares authorized, no shares issued or outstanding	—	—
Common stock, \$0.0025 par value, 100,000 shares authorized		
At December 31, 2018, 46,378 shares issued and outstanding; at December 31, 2017, 44,219 shares issued and outstanding	116	111
Additional paid-in capital	564,722	545,953
Accumulated other comprehensive income (loss)	(7,126)	398
Accumulated deficit	(397,472)	(352,011)
Total stockholders' equity	160,240	194,451
Total liabilities and stockholders' equity	\$ 340,576	\$ 402,953

See Accompanying Notes to Consolidated Financial Statements.

NEOPHOTONICS CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except per share data)	Years Ended December 31,		
	2018	2017	2016
Revenue	\$ 322,540	\$ 292,894	\$ 411,423
Cost of goods sold	256,367	231,415	294,290
Gross profit	66,173	61,479	117,133
Operating expenses:			
Research and development	53,818	58,287	57,376
Sales and marketing	16,728	17,760	18,595
General and administrative	30,403	34,453	34,409
Amortization of purchased intangible assets	475	472	1,609
Acquisition and asset sale related costs	427	130	2,125
Restructuring charges	3,135	3,934	—
Litigation settlement	2,645	—	—
Loss (gain) on asset sale	200	(2,193)	—
Total operating expenses	107,831	112,843	114,114
Income (loss) from operations	(41,658)	(51,364)	3,019
Interest income	397	198	303
Interest expense	(2,493)	(1,362)	(402)
Other income, net	1,446	104	472
Total interest and other income (expense), net	(650)	(1,060)	373
Income (loss) before income taxes	(42,308)	(52,424)	3,392
Provision for income taxes	(1,329)	(909)	(3,597)
Net loss	\$ (43,637)	\$ (53,333)	\$ (205)
Basic net loss per share	\$ (0.97)	\$ (1.23)	(0.00)
Diluted net loss per share	\$ (0.97)	\$ (1.23)	(0.00)
Weighted average shares used to compute basic net loss per share	45,144	43,431	41,798
Weighted average shares used to compute diluted net loss per share	45,144	43,431	41,798

See Accompanying Notes to Consolidated Financial Statements.

NEOPHOTONICS CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(in thousands)	Years ended December 31,		
	2018	2017	2016
Net loss	\$ (43,637)	\$ (53,333)	\$ (205)
Other comprehensive income (loss):			
Foreign currency translation adjustments, net of zero tax	(7,464)	8,803	(6,640)
Unrealized gain on available-for-sale securities, net of zero tax	1	17	10
Defined benefit pension plans:			
Loss arising during the period	(95)	(32)	(72)
Curtailments, settlements and other	—	—	—
Tax	34	11	24
Total other comprehensive income (loss)	(7,524)	8,799	(6,678)
Comprehensive loss	\$ (51,161)	\$ (44,534)	\$ (6,883)

See Accompanying Notes to Consolidated Financial Statements.

NEOPHOTONICS CORPORATION
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(In thousands)	Common stock		Additional paid- in capital	Accumulated other comprehensive income (loss)	Accumulated deficit	Total stockholders' equity
	Shares	Amount				
Balances at December 31, 2015	40,986	\$ 102	\$ 511,750	\$ (1,723)	\$ (298,473)	\$ 211,656
Comprehensive loss	—	—	—	(6,678)	(205)	(6,883)
Issuance of common stock upon exercise of stock options	1,013	3	3,668	—	—	3,671
Issuance of common stock under employee stock purchase plan	351	1	2,778	—	—	2,779
Issuance of common stock for vested restricted stock units	226	—	—	—	—	—
Tax withholding related to vesting of restricted stock units	(50)	—	(615)	—	—	(615)
Stock-based compensation costs	—	—	14,797	—	—	14,797
Balances at December 31, 2016	42,526	106	532,378	(8,401)	(298,678)	225,405
Comprehensive loss	—	—	—	8,799	(53,333)	(44,534)
Issuance of common stock upon exercise of stock options	665	2	2,481	—	—	2,483
Issuance of common stock under employee stock purchase plan	349	1	2,392	—	—	2,393
Issuance of common stock for vested restricted stock units	806	2	(2)	—	—	—
Tax withholding related to vesting of restricted stock units	(127)	—	(998)	—	—	(998)
Stock-based compensation costs	—	—	9,702	—	—	9,702
Balances at December 31, 2017	44,219	111	545,953	398	(352,011)	194,451
Impact of adoption of new accounting standard ASU 2016-16					(1,824)	(1,824)
Comprehensive loss	—	—	—	(7,524)	(43,637)	(51,161)
Issuance of common stock upon exercise of stock options	779	2	3,420	—	—	3,422
Issuance of common stock under employee stock purchase plan	404	1	2,190	—	—	2,191
Issuance of common stock for vested restricted stock units	1,124	2	(2)	—	—	—
Tax withholding related to vesting of restricted stock units	(148)	—	(954)	—	—	(954)
Stock-based compensation costs	—	—	14,115	—	—	14,115
Balances at December 31, 2018	46,378	\$ 116	\$ 564,722	\$ (7,126)	\$ (397,472)	\$ 160,240

See Accompanying Notes to Consolidated Financial Statements.

NEOPHOTONICS CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)	Years ended December 31,		
	2018	2017	2016
Cash flows from operating activities			
Net loss	\$ (43,637)	\$ (53,333)	\$ (205)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	31,105	28,350	22,400
Stock-based compensation expense	14,142	8,206	17,076
Deferred taxes	(328)	792	(668)
Amortization of investment, debt and other	438	247	159
Loss (gain) on disposal of property and equipment	1,322	(1,746)	185
Loss (gain) on foreign currency hedges	2,220	(2,104)	1,640
Allowance for doubtful accounts	61	577	(382)
Write-down of inventories	6,133	8,349	2,983
Foreign currency remeasurement and other, net	(3,944)	2,583	(2,661)
Asset impairment charges	—	324	—
Change in assets and liabilities:			
Accounts receivable	(7,874)	13,166	2,496
Inventories	7,368	(22,347)	(1,332)
Prepaid expenses and other assets	8,162	(11,409)	(11,184)
Accounts payable	(1,411)	(10,874)	23,111
Accrued and other liabilities	5,838	6,452	218
Net cash provided by (used in) operating activities	19,595	(32,767)	53,836
Cash flows from investing activities			
Purchase of property, plant and equipment	(14,867)	(47,409)	(51,693)
Proceeds from sale of property, plant and equipment and other assets	32	21,809	179
Purchase of marketable securities	(920)	(52,062)	(82,728)
Proceeds from sale of marketable securities	5,000	52,272	63,841
Proceeds from maturity of marketable securities	750	6,458	23,148
Restricted cash payable related to asset sale	—	—	1,039
Settlement of foreign currency hedges	(1,776)	1,618	(1,599)
Net cash used in investing activities	(11,781)	(17,314)	(47,813)
Cash flows from financing activities			
Proceeds from exercise of stock options and issuance of stock under ESPP	5,614	4,893	6,587
Tax withholding on restricted stock units	(954)	(998)	(615)
Payments for public stock offering, net of offering costs	—	(117)	(164)
Proceeds from bank loans	34,305	112,834	95,200
Repayment of bank and acquisition-related loans	(63,040)	(68,492)	(96,119)
Proceeds from issuance of notes payable	7,137	6,621	16,032
Repayment of notes payable	(3,732)	(11,639)	(18,007)
Proceeds from government grants	1,210	—	602
Net cash (used in) provided by financing activities	(19,460)	43,102	3,516
Effect of exchange rates on cash, cash equivalents and restricted cash	(680)	1,958	(1,702)
Net increase (decrease) in cash, cash equivalents and restricted cash	(12,326)	(5,021)	7,837
Cash, cash equivalents and restricted cash at the beginning of the period	81,564	86,585	78,748
Cash, cash equivalents and restricted cash at the end of the period	\$ 69,238	\$ 81,564	\$ 86,585
Supplemental disclosure of cash flow information:			
Cash paid for interest	\$ 1,600	\$ 732	\$ 263
Net cash paid (received) for income taxes	(1,383)	5,388	2,215
Supplemental disclosure of noncash investing and financing activities:			
Unpaid deferred offering costs	—	—	117
Decrease (increase) in unpaid property, plant and equipment	8,548	6,072	(13,629)
Capital lease	362	—	—
Asset retirement obligation	—	2,146	—

See Accompanying Notes to Consolidated Financial Statements.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. The Company and basis of presentation

Business and organization

NeoPhotonics Corporation and its subsidiaries (NeoPhotonics or the Company) develops, manufactures and sells optoelectronic products that transmit, receive and switch high speed digital optical signals for communications networks. The Company sells its products worldwide, primarily to leading network equipment manufacturers.

Certain Significant Risks and Uncertainties

The Company operates in a dynamic industry and, accordingly, can be affected by a variety of factors. For example, any of the following areas could have a negative effect on the Company in terms of its future financial position, results of operations or cash flows: the general state of the U.S., China and world economies; the highly cyclical nature of the industries the Company serves; the loss of any of a small number of its larger customers; ability to obtain additional financing; inability to meet certain debt covenants; failure to successfully integrate completed acquisitions; fundamental changes in the technology underlying the Company's products; the hiring, training and retention of key employees; successful and timely completion of product design efforts; and new product design introductions by competitors.

Consolidation

The consolidated financial statements include the accounts of the Company and its wholly owned subsidiaries. Intercompany accounts and transactions have been eliminated in consolidation.

Going Concern

Accounting Standards Update ("ASU") No. 2014-15, Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern, requires an entity to disclose information about its potential inability to continue as a going concern when conditions and events indicate that it is probable that the entity may be unable to meet its obligations as they become due within one year. Management has assessed the Company's ability to continue as a going concern within one year of the filing date of this Annual Report on Form 10-K with the Securities and Exchange Commission ("SEC") in March 2019. The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business.

As of December 31, 2018, the Company's working capital was \$116.8 million, including available cash, cash equivalents, short-term investments and restricted cash of approximately \$76.7 million. In 2018, the Company had operating losses of \$41.7 million and cash from operations of \$19.6 million. It had an accumulated deficit of approximately \$397.5 million as of December 31, 2018.

Through 2017 and the early part of 2018, the Company's operating results and cash flows were negatively affected by demand that was lower than customer estimates that were used to put capacity in place in 2016 and 2017. In the second half of 2018, demand continued to strengthen, primarily due to volume growth in the Americas as a result of metro and, particularly, data center interconnect deployments, as well as being the result of increased domestic provincial deployments in China plus exports by Chinese OEMs for international deployments.

To adjust to the demand that was less than estimates used for capacity decisions, the Company implemented restructuring plans in May and September 2017 that included a reduction in force and consolidation of facilities, in order to reduce expenses. The Company has also reduced or delayed certain product development projects and capital expenditures, aggressively pursued collections of accounts and notes receivable and continued to closely manage production and inventory levels. The Company continues to implement actions to improve cash flow and profitability.

In September 2017, the Company entered into a revolving line of credit agreement with Wells Fargo Bank, National Association ("Wells Fargo") which provides for borrowings under an accounts receivable based formula up to a maximum of \$50.0 million. As of December 31, 2018, \$36.0 million was outstanding under this line. The remaining borrowing capacity as of December 31, 2018 was \$14.0 million, of which \$5.0 million is required to be maintained as unused borrowing capacity. Borrowings under the Wells Fargo line are not due until June 30, 2022 as long as the borrowing base is not less than the outstanding amount (see Note 12). Additionally, the Company had \$4.8 million of notes payable and \$2.9 million of current portion of long-term debt as of December 31, 2018, which it plans to pay out of its existing available cash.

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The Company currently believes it will have sufficient resources to fund its currently planned operations and expenditures over the next twelve months without additional financing or other actions. In addition, the Company believes there are a number of ongoing and potential actions that may further strengthen its projected cash and projected financial position.

The Company operates in an industry that makes its prospects difficult to evaluate with certainty. Future declines in China market demand or other changes to the Company's forecasts could adversely affect the Company's results of operations, financial position and cash flows. As a result, the Company may need to raise additional debt or equity capital to fund its operations. Any additional debt arrangements may likely require regular interest and principal payments which could adversely affect the Company's operations. There can be no assurance that additional debt or equity capital will be available on acceptable terms, or at all.

2. Summary of significant accounting policies

Use of estimates

The preparation of financial statements in accordance with U.S. generally accepted accounting principles ("U.S. GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported revenue and expenses during the reporting period. Significant estimates made by management include: the useful lives of property, plant and equipment and intangible assets as well as future cash flows to be generated by those assets; fair values of identifiable assets acquired and liabilities assumed in business combinations; allowances for doubtful accounts; valuation allowances for deferred tax assets; write off of excess and obsolete inventories; the valuation of the Rusnano payment derivative and the valuations and recognition of stock-based compensation, among others. Actual results could differ from these estimates.

Concentration of credit risk and significant customers

Financial instruments that potentially subject the Company to concentrations of credit risk are primarily cash and cash equivalents and trade accounts receivable. The Company's investment policy requires cash and cash equivalents to be placed with high-credit quality institutions and limits on the amount of credit risk from any one issuer. The Company performs ongoing credit evaluations of its customers' financial condition whenever deemed necessary and generally does not require collateral. The Company maintains an allowance for doubtful accounts based upon the expected collectability of all accounts receivable, which takes into consideration an analysis of historical bad debts, specific customer creditworthiness and current economic trends.

Customers accounting for more than 10% of our total revenue and revenue from our top five customers for the years ended December 31, 2018, 2017 and 2016 were as follows:

	Years Ended December 31,		
	2018	2017	2016
Percent of revenue from customers accounting for 10% or more of total revenue:			
Huawei Technologies Co., Ltd	46%	40%	50%
Ciena Corporation	24%	16%	15%
Percent of revenue from top five customers	87%	78%	82%

As of December 31, 2018, two customers accounted for approximately 35% and 17%, respectively, of the Company's total accounts receivable. As of December 31, 2017, three customers accounted for 36%, 14% and 10% of the Company's total accounts receivable.

Restricted cash

As a condition of the notes payable lending arrangements and the line of credit facilities, the Company is required to keep a compensating balance at the issuing banks. In addition, the Company also maintained restricted cash in connection with the asset purchase agreement executed in December 2016 (see Note 10), government grants received in advance and cash balances temporarily restricted for regular business operations until a legal dispute is resolved (see Note 14). These balances have been excluded from the Company's cash and cash equivalents balance and are classified as restricted cash in the Company's consolidated balance sheets. As of December 31, 2018 and 2017, the amount of restricted cash was \$11.1 million and \$2.7 million, respectively.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Cash, cash equivalents and investments

Highly liquid investments with a maturity of 90 days or less at the date of purchase are considered cash equivalents, with the exception of money market funds and commercial paper which are classified as short-term investments. Marketable securities are reported at fair value and are classified as available-for-sale investments in our current assets because they represent investments of cash available for current operations and for strategic reasons. As a result, the Company recorded all its marketable securities in short-term investments regardless of the contractual maturity date of the securities.

The Company regularly reviews its investment portfolio to identify and evaluate investments that have indications of possible impairment. Factors considered in determining whether a loss is other-than-temporary include: the length of time and extent to which the fair market value has been lower than the cost basis, the financial condition and near-term prospects of the investee, credit quality, likelihood of recovery, and the Company's ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in fair market value.

Unrealized gains and losses, net of tax, are included in accumulated other comprehensive loss as a separate component of stockholders' equity on the consolidated balance sheets. The amortization of premiums and discounts on the investments, and realized gains and losses on available-for-sale securities are included in other income, net in the consolidated statements of operations. The Company uses the specific-identification method to determine cost in calculating realized gains and losses upon the sale of its marketable securities.

Fair Value Measurements

Fair value is defined as the price at which an asset could be exchanged in a current transaction between knowledgeable, willing parties. A liability's fair value is defined as the amount that would be paid to transfer the liability to a new obligor, not the amount that would be paid to settle the liability with the creditor. Where available, fair value is based on observable market prices or parameters or derived from such prices or parameters. Where observable prices or inputs are not available, valuation models are applied. These valuation techniques involve some level of management estimation and judgment, the degree of which is dependent on the price transparency for the instruments or market and the instruments' complexity. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. The authoritative accounting guidance describes a fair value hierarchy based on three levels of inputs that may be used to measure fair value, of which the first two are considered observable and the last is considered unobservable. These levels of inputs are as follows:

Level 1—Observable inputs such as unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date.

Level 2—Inputs (other than quoted prices included in Level 1) are either directly or indirectly observable for the asset or liability. These include quoted prices for similar assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.

Level 3—Unobservable inputs that reflect management's best estimate of what market participants would use in pricing the asset or liability at the measurement date. Consideration is given to the risk inherent in the valuation technique and the risk inherent in the inputs to the model.

For marketable securities measured at fair value using Level 2 inputs, the Company reviews trading activity and pricing for these investments as of the measurement date. When sufficient quoted pricing for identical securities is not available, the Company uses market pricing and other observable market inputs for similar securities obtained from various third party data providers. These inputs either represent quoted prices for similar assets in active markets or have been derived from observable market data.

Accounts receivable

Accounts receivable include trade receivables and notes receivable from customers. The notes are generally due within nine months. The Company receives notes receivable in exchange for accounts receivable from certain customers in China that are secured by the customer's affiliated financial institution.

An allowance for doubtful accounts is calculated based on the aging of the Company's trade receivables, historical experience, and management judgment. The Company writes off trade receivables against the allowance when management determines a balance is uncollectible and is no longer actively pursuing collection of the receivable.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Inventories

Inventories consist of on-hand raw materials, work-in-progress inventories and finished goods. Raw materials and work-in-progress inventories are stored mainly on the Company's premises. Finished goods are stored on the Company's premises as well as on consignment at certain customer sites.

Inventories are stated at the lower of standard cost, which approximates actual cost determined on the weighted average basis, or net realizable value. Inventories are recorded using the first-in, first-out method. The Company routinely evaluates quantities and values of inventories in light of current market conditions and market trends, and records a write-down for quantities in excess of demand and product obsolescence. The evaluation may take into consideration historic usage, expected demand, anticipated sales price, new product development schedules, the effect new products might have on the sale of existing products, product obsolescence, customer concentrations, product merchantability and other factors. Market conditions are subject to change and actual consumption of inventory could differ from forecasted demand. The Company also regularly reviews the cost of inventories against their estimated market value and records a lower of cost or market write-down for inventories that have a cost in excess of estimated market value, resulting in a new cost basis for the related inventories which is not reversed.

Business Combinations

We allocate the fair value of purchase consideration to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values as of the close of acquisition. The excess of the fair value of purchase consideration over the fair values of these identifiable assets and liabilities is recorded as goodwill. When determining the fair values of assets acquired and liabilities assumed, management makes significant estimates and assumptions through established and generally accepted valuation techniques.

Fair value estimates are based on the assumptions management believes a market participant would use in pricing the asset or liability. Critical estimates in valuing certain intangible assets include, but are not limited to, future expected cash flows from customer relationships and acquired patents and developed technology as well as discount rates. Management's estimates of fair value are based upon assumptions believed to be reasonable, but which are inherently uncertain and unpredictable and, as a result, actual results may differ from estimates.

Amounts recorded in a business combination may change during the measurement period, which is a period not to exceed one year from the date of acquisition, as additional information about conditions existing at the acquisition date becomes available.

Goodwill

Goodwill is reviewed for impairment annually in the fourth fiscal quarter or more frequently if events or changes in circumstances indicate that the carrying value of goodwill may not be recoverable. The Company will assess the qualitative factors to determine whether it is more likely than not that the fair value of its reporting unit is less than its carrying amount as a basis for determining whether it is necessary to perform the two-step goodwill impairment. If the Company determines that it is more likely than not that its fair value is less than its carrying amount, then the two-step goodwill impairment test is performed. The first step, identifying a potential impairment, compares the fair value of the reporting unit with its carrying amount. If the carrying amount exceeds its fair value, the second step would need to be performed; otherwise, no further steps are required. The second step, measuring the impairment loss, compares the implied fair value of the goodwill with the carrying amount of the goodwill. Any excess of the goodwill carrying amount over the implied fair value is recognized as an impairment loss, and the carrying value of goodwill is written down to fair value. The Company had no goodwill impairment in 2018 or 2017.

Long-lived assets

Property, plant and equipment are stated at cost, net of accumulated depreciation and amortization. Repairs and maintenance costs are expensed as incurred. Depreciation and amortization are computed using the straight-line method over the following estimated useful lives:

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Buildings	20-30 years
Machinery and equipment	2-7 years
Furniture, fixtures and office equipment	3-5 years
Software	5-7 years
Leasehold improvements	life of the asset or lease term, if shorter

Intangible assets acquired in a business combination are recorded at fair value. Identifiable finite-lived intangible assets are amortized over the period of estimated benefit using the straight-line method, reflecting the pattern of economic benefits associated with these assets. The estimated useful lives of the Company's finite-lived intangible assets generally range from two to seven years. The acquired land use rights in China have an estimated useful life of 45 years.

Assets held for sale are measured at the lower of carrying value or the fair value less cost to sell. The carrying value of intangible assets and other long-lived assets is reviewed on a regular basis for the existence of facts or circumstances, both internally and externally, that may suggest impairment. Some factors which the Company considers to be triggering events for impairment review include a significant decrease in the market value of an asset, a significant change in the extent or manner in which an asset is used, a significant adverse change in the business climate that could affect the value of an asset, an accumulation of costs for an asset in excess of the amount originally expected, a current period operating loss or cash flow decline combined with a history of operating loss or cash flow uses or a projection that demonstrates continuing losses and a current expectation that, it is more likely than not, a long-lived asset will be disposed of at a loss before the end of its estimated useful life.

If one or more of such facts or circumstances exist, the Company will evaluate the carrying value of long-lived assets to determine if impairment exists by comparing it to estimated undiscounted future cash flows over the remaining useful life of the assets. If the carrying value of the assets is greater than the estimated future cash flow, the assets are written down to the estimated fair value. The Company's cash flow estimates contain management's best estimates, using appropriate and customary assumptions and projections at the time. Any write-down would be treated as a permanent reduction in the carrying amount of the asset and an operating loss would be recognized.

The Company recorded asset impairment charges of \$1.0 million and \$0.4 million in restructuring charges in 2018 and 2017, respectively (see Note 11). There were no asset impairment charges in 2016.

Revenue recognition

See Note 3.

Product warranties

The Company generally provides warranties to cover defects in workmanship, materials and manufacturing for a period of one to three years to meet the stated functionality as agreed to in each sales arrangement. Products are tested against specified functionality requirements prior to delivery, but the Company nevertheless from time to time experiences claims under its warranty guarantees. The Company accrues for estimated warranty costs under those guarantees based upon historical experience, and for specific items, at the time their existence is known and the amounts are determinable.

Research and development

Research and development expense consists of personnel costs, including stock-based compensation expense, for the Company's research and development personnel and product development costs, including engineering services, development software and hardware tools, depreciation of capital equipment and facility costs. Research and development costs are expensed as incurred.

Advertising costs

Advertising costs are expensed as incurred and, to date, have not been significant.

Stock-based compensation

The Company grants stock-based awards to employees, consultants and directors. The stock-based awards, including stock options, restricted stock units, employee stock purchase rights, stock appreciation units and market-based awards, are

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

accounted for at estimated fair values. Vesting of stock-based awards is generally subject to the grantee's continuing service to the Company.

The Company generally determines the fair value of stock options and stock appreciation rights utilizing the Black-Scholes-Merton option-pricing model, or a lattice-binomial option-pricing model for stock-based awards with a market condition. The fair value of employee grants is measured on the date of grant and then recognized over the period during which an employee is required to provide services in exchange for the award, known as the requisite service period (usually the vesting period) on a straight-line basis. The fair value of non-employee grants is measured on the date of grant and then marked to market until vest dates and then recognized over the requisite service period.

The Company records expense and an equal adjustment to the liability for stock appreciation units equal to the fair value of the vested portion of the awards as of each period end. Each reporting period thereafter, compensation expense will be recorded based on the remaining service period and the then fair value of the award until vesting of the award is completed. After vesting is completed, the Company will continue to re-measure the fair value of the liability each reporting period until the award is exercised or expires, with changes in the fair value of the liability recorded in the consolidated statements of operations.

Restricted stock units are valued at the closing sales price as quoted on the New York Stock Exchange on the date of grant, and are converted into shares of common stock upon vesting on a one-for-one basis. The compensation expense related to the restricted stock units is determined using the fair value of common stock on the date of grant, and the expense is recognized on a straight-line basis over the vesting period.

Employee stock purchase rights are accounted for at fair value, utilizing the Black-Scholes-Merton option-pricing model.

Stock-based compensation expense for modified stock-based awards are recognized using the pool approach, under which the remaining compensation cost from the original awards plus the incremental costs, if any, of the related modified awards is recognized in its entirety over the remaining portion of the requisition service period of the corresponding modified awards.

Stock-based compensation expense recognized at fair value includes the impact of estimated forfeitures. The Company estimates future forfeitures at the date of grant and revises the estimates, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Income taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the carrying amounts of existing assets and liabilities in the financial statements and their respective tax bases, and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities from a change in tax rates is recognized in the consolidated statement of operations in the period that includes the enactment date.

The Company operates in various tax jurisdictions and is subject to audit by various tax authorities. In preparing the Company's consolidated financial statements, the Company is required to estimate its taxes in each of the jurisdictions in which it operates. The Company estimates actual current tax exposure as well as assesses temporary differences resulting from different treatment of items, such as accruals and allowances not currently deductible for tax purposes. These differences result in deferred tax assets which represent future tax benefits to be received when certain expenses previously recognized in the financial statements become deductible expenses under applicable income tax laws, or loss credit carryforwards are utilized.

In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of a deferred tax asset will be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. A valuation allowance is recorded for loss carryforwards and other deferred tax assets where it is more likely than not that such deferred tax assets will not be realized. The Company classifies its net deferred tax assets as other long-term assets and deferred tax liabilities as noncurrent liabilities on its consolidated balance sheet.

Foreign currency

Generally the functional currency of the Company's international subsidiaries is the local currency. The Company translates the financial statements of these subsidiaries to U.S. dollars using month-end rates of exchange for assets and liabilities, and average rates of exchange for revenue, costs, and expenses. Translation gains and losses are recorded in

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

accumulated other comprehensive income (loss) as a component of stockholders' equity. Effective July 1, 2016, the Company has established a hedging program using monthly forward exchange contracts as economic hedges to protect against volatility of foreign exchange rate exposure of its net intercompany activities based on a cost-benefit analysis that considers that magnitude of the exposure, the volatility of the exchange rate and the cost of the hedging instruments. The forward contracts are not designated for hedge accounting and are marked to market at fair value and reported as either other current assets or accounts payable. Any changes in the fair value are recorded as foreign exchange gain (loss) and help mitigate the changes in the value of the underlying net intercompany balances. The Company recognized a \$2.2 million loss and \$2.1 million gain in 2018 and 2017, respectively, relating to its foreign currency contracts within other income, net. Net foreign exchange gain (loss) was \$1.4 million, \$(0.5) million, and \$(0.1) million in 2018, 2017, and 2016, respectively. These gains and losses were recorded as other income, net in the Company's consolidated statements of operations. The Company presents the cash flows relating to these foreign exchange contracts as investing activities in its consolidated statements of cash flows. During the six months ended December 31, 2018, the Company temporarily discontinued entering into forward exchange contracts. This may increase the risks to us arising from the short-term impact of foreign currency fluctuations.

Net income (loss) per share

Basic net income (loss) per share is calculated by dividing net income (loss) by the weighted average number of common shares outstanding for the period. Diluted net income (loss) per share is calculated by dividing net income (loss) by the weighted average number of common shares and potential dilutive common share equivalents outstanding during the period if the effect is dilutive.

Accounting standards update recently adopted

Effective January 1, 2017, the Company adopted ASU 2016-9, *Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting* ("ASU 2016-9"). ASU 2016-9 simplifies certain aspects of the accounting for share-based payment transactions, including income taxes, classification of awards and classification in the statement of cash flows. It eliminates the requirement to delay the recognition of excess tax benefits until current taxes payable are reduced. Upon adoption, the Company's previously unrecognized excess tax benefits of \$8.6 million had no impact on its accumulated deficit balance as the related U.S. deferred tax assets were fully offset by a valuation allowance. The Company elected to apply the change in presentation in the statements of cash flows prospectively and elected to continue to account for estimated forfeitures over the vesting period of the share-based awards.

In May 2014, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2014-9, *Revenue from Contracts with Customers* ("ASU 2014-9"). The standard, along with the amendments issued in 2016 and 2015, provides companies with a single model for use in accounting for revenue arising from contracts with customers and supersedes current revenue recognition guidance, including industry-specific revenue guidance. The core principle of the model is to recognize revenue when control of the goods or services transfers to the customer, as opposed to recognizing revenue when the risks and rewards transfer to the customer under the existing revenue guidance. ASU 2014-9 is required to be adopted, using either of two methods: (i) retrospective to each prior reporting period presented with the option to elect certain practical expedients as defined within ASU 2014-9; or (ii) retrospective with the cumulative effect of initially applying ASU 2014-9 recognized at the date of initial application and providing certain additional disclosures. This standard, as amended, is effective for annual and interim periods beginning after December 15, 2017 and permits entities to early adopt for annual and interim reporting periods beginning after December 15, 2016. The Company adopted this standard as of January 1, 2018, using the full retrospective transition method. See Note 3 for more details.

In May 2017, the FASB issued ASU No. 2017-9, *Compensation—Stock Compensation (718)—Scope of Modification Accounting* (ASU 2017-9"). This guidance redefines which changes to the terms and conditions of a share-based payment award require an entity to apply modification accounting for a share-based payment. ASU 2017-9 is effective for interim and annual periods after December 15, 2017 and early adoption is permitted in any interim period. The Company adopted this standard effective January 1, 2018. The impact on the Company's consolidated financial statements upon the adoption of this standard was immaterial.

In January 2017, the FASB issued ASU 2017-1, *Business Combinations (Topic 805): Clarifying the Definition of a Business* ("ASU 2017-1"). This standard provides a framework in determining when a set of assets and activities is a business. ASU 2017-1 is effective for interim and annual periods beginning after December 15, 2017 on a prospective basis. The Company adopted this standard effective January 1, 2018. The impact on the Company's consolidated financial statements upon the adoption of this standard was immaterial.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

In November 2016, the FASB issued ASU 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash* (“ASC 2016-18”). This standard provides guidance on the classification and presentation of restricted cash in the statement of cash flows and must be applied retrospectively. ASU 2016-18 is effective for fiscal years beginning after December 15, 2017. The Company adopted this standard effective January 1, 2018. The reclassified restricted cash balances from investing activities to changes in cash, cash equivalents and restricted cash on the condensed consolidated statements of cash flows were not material for all periods presented.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory* (“ASU 2016-16”). This standard provides guidance on the tax accounting for the transferring and receiving entities upon transfer of an asset. ASU 2016-16 is effective for the Company’s interim and annual periods beginning after December 15, 2017 and should be applied on a modified retrospective basis. Upon adoption of this standard on January 1, 2018, the Company recorded \$1.8 million to accumulated deficit balance for intra-entity transfer of an asset other than inventory in prior years.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments* (“ASU 2016-15”). This standard provides guidance on the classification of certain cash receipts and payments in the statement of cash flows. It is effective, retrospectively, for the Company’s annual and interim reporting periods beginning after December 15, 2017 or prospectively from the earliest date practicable if retrospective application is impracticable. The Company adopted this standard effective January 1, 2018, using the retrospective transition method. The impact on the Company’s consolidated financial statements upon the adoption of this standard was immaterial.

In January 2016, the FASB issued ASU 2016-1, *Financial Instruments - Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities* (“ASU 2016-1”). ASU 2016-1 revises an entity’s accounting related to (1) the classification and measurement of investments in equity securities and (2) the presentation of certain fair value changes for financial liabilities measured at fair value. It also amends certain disclosure requirements associated with the fair value of financial instruments and is effective for the Company’s annual and interim reporting periods beginning after December 15, 2017. The Company adopted this standard effective January 1, 2018. The impact on the Company’s consolidated financial statements upon the adoption of this standard was immaterial.

In March 2017, the FASB issued ASU No. 2017-7, *Compensation-Retirement Benefits (Topic 715)-Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost* (“ASU 2017-7”). This guidance revises the presentation of employer-sponsored defined benefit pension and other postretirement plans for the net periodic benefit cost in the statement of operations and requires that the service cost component of net periodic benefit be presented in the same income statement line items as other employee compensation costs for services rendered during the period. The other components of the net benefit costs are required to be presented in the statement of operations separately from the service cost component and outside the subtotal of income from operations. This guidance allows only the service cost component of net periodic benefit costs to be eligible for capitalization. ASU 2017-7 is effective for interim and annual periods after December 15, 2017. The Company adopted this standard effective January 1, 2018. The impact on the Company’s consolidated financial statements upon the adoption of this standard was immaterial.

Recent accounting standards update not yet effective

In January 2017, the FASB issued ASU 2017-4, *Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment* (“ASU 2017-4”). This standard amends the goodwill impairment test to compare the fair value of a reporting unit with its carrying amount and recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit’s fair value, up to the total amount of goodwill allocated to that reporting unit. ASU 2017-4 is effective prospectively for interim and annual periods beginning after December 15, 2019. Early adoption is permitted for interim and annual goodwill impairment tests performed on testing dates after January 1, 2017. The Company has not determined whether it will elect early adoption and is currently evaluating the impact of the adoption of this standard on its consolidated financial statements and related disclosures.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* (“ASU 2016-13”). ASU 2016-13 amends existing guidance on the impairment of financial assets and adds an impairment model that is based on expected losses rather than incurred losses and requires an entity to recognize as an allowance its estimate of expected credit losses for its financial assets. An entity will apply this guidance through a cumulative-effect adjustment to retained earnings upon adoption (a modified-retrospective approach) while a prospective transition approach is required for debt securities for which an other-than-temporary impairment had been recognized before the effective date. It is effective for the Company’s annual and interim reporting periods beginning after December 15, 2019. Early adoption is permitted. The Company is in the process of evaluating the impact of the adoption on its consolidated financial statements and related disclosure.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

In February 2016, the FASB issued ASU 2016-2, *Leases (Topic 842)* (“ASU 2016-2”). ASU 2016-2 introduces a lessee model that requires recognition of assets and liabilities arising from qualified leases on the consolidated balance sheets and consolidated statements of operations and to disclose qualitative and quantitative information about lease transactions. It is effective for interim and annual periods beginning after December 15, 2018. Early adoption is permitted. Certain optional practical expedients allowed. The Company will adopt this standard in the first quarter of 2019, using the modified retrospective transition method and recording a cumulative-effect balance sheet adjustment. The Company has completed the identification of qualified leases. The Company is currently in the process of measuring the right to use assets and lease liabilities on the date of adoption for the qualified leases. The adoption of this guidance is expected to have a material impact on the Company's consolidated balance sheets and disclosures in consolidated financial statements. However, the adoption of this standard is not expected to have a material impact on the Company's consolidated statement of operations.

3. Revenue

Adoption of ASC Topic 606, “Revenue from Contracts with Customers”

On January 1, 2018, the Company adopted Topic 606 using the full retrospective method which required it to restate each prior reporting period presented. The adoption did not have a material impact on the Company's consolidated financial statements and as a result, no changes were made to prior reporting periods presented.

Product revenue

The Company develops, manufactures and sells optoelectronic products that transmit, receive, modify and switch high speed digital optical signals for communications networks. Revenue is derived primarily from the sale of hardware products. The Company sells its products worldwide, primarily to leading network equipment manufacturers.

Revenue recognition

Revenue is recognized upon transfer of control of promised products or services to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products or services. The Company generally bears all costs, risk of loss or damage and retains title to the goods up to the point of transfer of control of promised products to customer. Revenue related to the sale of consignment inventories at customer vendor managed locations is not recognized until the products are pulled from consignment inventories by customers. In instances where acceptance of the product or solutions is specified by the customer, revenue is deferred until such required acceptance criteria have been met. Shipping and handling costs are included in the cost of goods sold. The Company presents revenue net of sales taxes and any similar assessments.

Nature of products

Revenue from sale of hardware products is recognized upon transfer of control to the customer. The performance obligation for the sale of hardware products is satisfied at a point in time. The Company has aligned its products in two groups - High Speed Products and Network Products and Solutions. The following presents revenue by product group (in thousands):

	Years Ended December 31,		
	2018	2017	2016
High Speed Products	\$ 275,803	\$ 241,780	\$ 277,258
Network Products and Solutions	46,737	51,114	134,165
Total revenue	\$ 322,540	\$ 292,894	\$ 411,423

The following table presents the Company's revenue information by geographical region. Revenue is classified based on the ship to location requested by the customer. Such classification recognizes that for many customers, including those in North America or in Europe, designated shipping points are often in China or elsewhere in Asia (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

	Years Ended December 31,		
	2018	2017	2016
China	\$ 187,277	\$ 161,637	\$ 254,625
Americas	70,906	52,973	76,091
Rest of world	64,357	78,284	80,707
Total revenue	\$ 322,540	\$ 292,894	\$ 411,423

Certain prior period amounts have been reclassified to conform to the current period presentation.

Deferred revenue

The Company records deferred revenue when cash payments are received or due in advance of our performance. Refer to Note 9 for disclosure of deferred revenue balances. The increase in the deferred revenue balances during 2018 was immaterial, offset by approximately \$0.9 million of revenue recognized during 2018 that was included in the deferred revenue balance as of December 31, 2017. The increase in the deferred revenue balances during 2017 was \$1.6 million, offset by approximately \$1.1 million of revenue recognized during 2017, respectively, that was included in the deferred revenue balance as of December 31, 2016.

Contract assets

The Company records contract assets when the revenue is recognized but the customer payment is contingent on a future event. The balance of contract assets as of December 31, 2018 and December 31, 2017 was immaterial.

Refund liabilities

The Company records refund liabilities when the contract permits the customer to return the product if certain circumstances arise. The balance of refund liabilities as of December 31, 2018 and December 31, 2017 was immaterial.

4. Cash, cash equivalents, short-term investments and restricted cash

The following table summarizes the Company's cash, cash equivalents, short-term investments, and restricted cash at December 31, 2018 and 2017 (in thousands):

	December 31, 2018	December 31, 2017
Cash and cash equivalents:		
Cash	\$ 58,185	78,906
Cash equivalents	—	—
Cash and cash equivalents	\$ 58,185	\$ 78,906
Short-term investments	\$ 7,481	\$ 12,311
Restricted cash	\$ 11,053	\$ 2,658
	December 31, 2018	December 31, 2017
Cash and cash equivalents	\$ 58,185	\$ 78,906
Restricted cash	11,053	2,658
Total cash, cash equivalents and restricted cash shown in the consolidated statement of cash flows	\$ 69,238	\$ 81,564

The following table summarizes the Company's unrealized gains and losses related to the cash equivalents and short-term investments in marketable securities designated as available-for-sale (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

	As of December 31, 2018				As of December 31, 2017			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Loss	Fair Value	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Loss	Fair Value
Marketable securities:								
Money market accounts	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Money market funds	7,481	—	—	7,481	11,561	—	—	11,561
Corporate debt securities	—	—	—	—	—	—	—	—
U.S. government securities	—	—	—	—	751	—	(1)	750
Sovereign government bonds	—	—	—	—	—	—	—	—
Total	\$ 7,481	\$ —	\$ —	\$ 7,481	\$ 12,312	\$ —	\$ (1)	\$ 12,311
Reported as:								
Cash equivalents	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Short-term investments	7,481	—	—	7,481	12,312	—	(1)	12,311
Total	\$ 7,481	\$ —	\$ —	\$ 7,481	\$ 12,312	\$ —	\$ (1)	\$ 12,311

As of December 31, 2018 and 2017, maturities of marketable securities were as follows (in thousands):

	December 31, 2018	December 31, 2017
Less than 1 year	\$ 7,481	\$ 12,311
Due in 1 to 2 years	—	—
Due in 3 to 5 years	—	—
Total	\$ 7,481	\$ 12,311

Realized gains and losses on the sale of marketable securities during the years ended December 31, 2018, 2017 and 2016 were immaterial. The Company did not recognize any impairment losses on its marketable securities during the years ended December 31, 2018, 2017 or 2016. As of December 31, 2018, the Company did not have any investments in marketable securities that were in an unrealized loss position for a period in excess of 12 months.

5. Fair value measurements

Assets and Liabilities Measured at Fair Value on a Recurring Basis

The following table presents the Company's assets that are measured at fair value on a recurring basis (in thousands):

	December 31, 2018				December 31, 2017			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Cash equivalents and short-term investments:								
Money market funds	\$ 7,481	\$ —	\$ —	\$ 7,481	\$ 11,561	\$ —	\$ —	\$ 11,561
U.S. government securities	—	—	—	—	750	—	—	750
Money market accounts	—	—	—	—	—	—	—	—
Total	\$ 7,481	\$ —	\$ —	\$ 7,481	\$ 12,311	\$ —	\$ —	\$ 12,311
Mutual funds held in Rabbi Trust, recorded in other long-term assets	\$ 465	\$ —	\$ —	\$ 465	\$ 523	\$ —	\$ —	\$ 523

The Company offers a Non-Qualified Deferred Compensation Plan ("NQDC Plan") to a select group of its highly compensated employees to provide participants the opportunity to defer payment of certain compensation as defined in the NQDC Plan. A Rabbi Trust has been established to fund the NQDC Plan obligation, which was fully funded as of December 31, 2018 and 2017. The assets held by the Rabbi Trust are in the form of exchange traded mutual funds and are included in the

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Company's other long-term assets on its consolidated balance sheets as of December 31, 2018 and 2017. Level 1 assets are determined by using quoted prices in active markets for identical assets. The fair values of Level 2 assets are priced based on quoted market prices for similar instruments or non-binding market prices that are corroborated by observable market data using inputs such as benchmark yields, broker quotes and other similar data.

The following table presents the Company's liabilities that are measured at fair value on a recurring basis (in thousands):

	As of December 31, 2018				As of December 31, 2017			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Rusnano payment derivative	\$ —	\$ —	\$ 2,000	\$ 2,000	\$ —	\$ —	\$ 389	\$ 389
Foreign currency forward contracts	—	—	—	—	—	(43)	—	(43)
	\$ —	\$ —	\$ 2,000	\$ 2,000	\$ —	\$ (43)	\$ 389	\$ 346

The fair value of the Rusnano payment derivative is based on the Company's estimate (see Note 14). The fair values of the foreign currency forward contracts are based on quoted market rates and market observable data for similar instruments. There were no transfers between levels of the fair value hierarchy during the periods presented.

Assets and Liabilities Measured at Fair Value on a Nonrecurring Basis

In 2018, the Company wrote-off \$1.0 million of property, plant and equipment within operating expenses. These assets were measured at fair value which is zero due to events or circumstances the Company identified as having significant impact on their fair value during 2018.

In 2018, the Company reclassified \$2.5 million of property, plant and equipment within assets held for sale. The estimated fair value less direct costs of sale approximates the related carrying value of these assets as of December 31, 2018 (see Note 9).

There were no other assets or liabilities measured at fair value on a nonrecurring basis in 2018 and 2017.

Assets and Liabilities Not Measured at Fair Value

The carrying values of cash, restricted cash, accounts receivable, accounts payable, notes payable and short-term borrowing approximate their fair values due to the short-term nature and liquidity of these financial instruments.

The fair value of the Company's long-term debt have been calculated using an estimate of the interest rate the Company would have had to pay on the issuance of liabilities with a similar maturity and discounting the cash flows at that rate which it considers to be a level 2 fair value measurement and was not materially different than the carrying value as of December 31, 2018 and 2017 as the interest rates approximated rates currently available to the Company. The fair values do not necessarily give an indication of the amount that the Company would currently have to pay to extinguish any of this debt.

6. Net loss per share

The following table sets forth the computation of the basic and diluted net loss per share attributable to NeoPhotonics Corporation common stockholders for the periods indicated (in thousands, except per share amounts):

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	Years Ended December 31,		
	2018	2017	2016
Numerator:			
Net loss	\$ (43,637)	\$ (53,333)	\$ (205)
Denominator:			
Weighted average shares used to compute per share amount:			
Basic	45,144	43,431	41,798
Dilutive effect of equity awards	—	—	—
Diluted	45,144	43,431	41,798
Basic net loss per share	\$ (0.97)	\$ (1.23)	(0.00)
Diluted net loss per share	\$ (0.97)	\$ (1.23)	(0.00)

The Company has excluded the impact of the following outstanding employee stock options, restricted stock units, common stock warrants and shares expected to be issued under its employee stock purchase plan from the computation of diluted net loss per share, as their effect would have been antidilutive (in thousands):

	December 31,		
	2018	2017	2016
Employee stock options	3,203	3,934	4,301
Restricted stock units	2,486	2,405	2,089
Market-based restricted stock units	695	—	—
Employee stock purchase plan	414	421	306
	6,798	6,760	6,696

7. Business Combinations

EMCORE Corporation

On January 2, 2015, the Company closed an acquisition of certain assets and assumed certain liabilities of the tunable laser product lines of EMCORE Corporation (“EMCORE”) for an original purchase price of \$17.5 million, pursuant to the terms of the Asset Purchase Agreement between the parties dated October 22, 2014. Consideration for the transaction consisted of \$1.5 million in cash and a promissory note (the “EMCORE Note”) of approximately \$16.0 million, which was subsequently adjusted to \$15.5 million in connection with a True-Up Confirmation Agreement (the “True-Up Agreement”) executed by and between the Company and EMCORE on April 16, 2015. The final adjusted purchase price for the acquisition was approximately \$17.0 million.

The Company accounted for this acquisition as a business combination. With the acquisition of the EMCORE ultra narrow linewidth tunable laser products, the Company aims to strengthen its portfolio of High Speed Products.

In connection with the acquisition, the Company incurred approximately \$0.9 million in total acquisition-related costs related to legal, accounting and other professional services. The acquisition costs were expensed as incurred and included in operating expenses in the Company’s consolidated statement of operations.

The fair values assigned to intangible assets acquired were based on valuations using estimates and assumptions provided by management, with the assistance of an independent third party appraisal firm. The excess purchase price over those fair values was recorded as goodwill. The Company used best estimates and assumptions as part of the purchase price allocation process to value assets acquired and liabilities assumed at the acquisition date and during the Company’s process of obtaining further information, further refined estimates and assumptions, including the acquired property, plant and equipment, prepaid and other current assets, which primarily consisted of held-for-sale assets and accounts payable. As a result, during the measurement period completed in 2015, the Company recorded adjustments related to the acquired net accounts receivable, the acquired net inventories, the assumed sales tax accrual and the acquired prepaid expenses and other current assets by immaterial amounts, and decreased goodwill by a corresponding net amount. Goodwill recorded consisted of a valuable assembled workforce and market synergy. The amounts assigned to goodwill are deductible for income tax purposes.

The following table summarizes the allocation of the assets acquired and liabilities assumed as of the acquisition date and subsequent adjustments (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Total purchase consideration:

Cash paid	\$ 1,500
Notes payable	15,482
Total	<u>\$ 16,982</u>

Fair value of assets acquired:

Accounts receivable	\$ 9,274
Inventories	1,693
Prepaid expenses and other current assets	670
Property, plant and equipment	6,917
Intangible assets acquired:	
Developed technology	4,100
Customer relationships	700
Total	<u>\$ 23,354</u>

Less: fair value of liabilities assumed:

Accounts payable	\$ (7,427)
Accrued liabilities	(60)
Total	<u>\$ (7,487)</u>
Goodwill	<u>\$ 1,115</u>

Purchased intangibles with finite lives will be amortized on a straight-line basis over their respective estimated useful lives. The following table presents details of the purchase price allocated to the acquired intangible assets at the acquisition date:

	Useful Life	Purchased intangible assets
	(In years)	(In thousands)
Developed technology	7	\$ 4,100
Customer relationships	2	700
Total purchased intangible assets		<u>\$ 4,800</u>

EigenLight Corporation

In November 2015 the Company closed an acquisition of the business and products of EigenLight Corporation for cash consideration of \$0.4 million in an asset transaction. The Company accounted for this as a business combination and the majority of the purchase price was allocated to inventory and property, plant and equipment.

8. Purchased intangible assets

Purchased intangible assets consist of the following (in thousands):

	December 31, 2018			December 31, 2017		
	Gross Assets	Accumulated Amortization	Net Assets	Gross Assets	Accumulated Amortization	Net Assets
Technology and patents	\$ 37,029	\$ (34,995)	\$ 2,034	\$ 37,684	\$ (34,923)	\$ 2,761
Customer relationships	15,146	(15,026)	120	15,425	(14,835)	590
Leasehold interest	1,238	(374)	864	1,309	(366)	943
	<u>\$ 53,413</u>	<u>\$ (50,395)</u>	<u>\$ 3,018</u>	<u>\$ 54,418</u>	<u>\$ (50,124)</u>	<u>\$ 4,294</u>

Amortization expense relating to technology and patents and the leasehold interest intangible assets is included within cost of goods sold, and customer relationships and the non-compete agreements within operating expenses. The following table

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

presents details of the amortization expense of the Company's purchased intangible assets as reported in the consolidated statements of operations (in thousands):

	Years ended December 31,		
	2018	2017	2016
Cost of goods sold	\$ 756	\$ 869	\$ 2,871
Operating expenses	475	472	1,609
Total	<u>\$ 1,231</u>	<u>\$ 1,341</u>	<u>\$ 4,480</u>

The estimated future amortization expense of purchased intangible assets as of December 31, 2018, is as follows (in thousands):

2019	\$ 856
2020	737
2021	644
2022	28
2023	28
Thereafter	725
	<u>\$ 3,018</u>

9. Balance sheet components

Restricted Cash

Restricted cash was as follows (in thousands):

	December 31,	
	2018	2017
Restricted in connection with notes payable and short-term borrowing (see Note 12)	\$ 2,589	\$ 537
Restricted in connection with asset purchase agreement (see Note 10)	2,019	2,121
Restricted in connection with a current legal dispute with APAT OE (See Note 10)	5,156	—
Restricted in connection with government grants received in advance	1,289	—
Total restricted cash	<u>\$ 11,053</u>	<u>\$ 2,658</u>
Reported as:		
Restricted cash	<u>\$ 11,053</u>	<u>\$ 2,658</u>

Accounts receivable, net

Accounts receivable, net were as follows (in thousands):

	December 31,	
	2018	2017
Accounts receivable	\$ 74,343	\$ 65,499
Trade notes receivable	672	2,356
Allowance for doubtful accounts	(264)	(626)
	<u>\$ 74,751</u>	<u>\$ 67,229</u>

The table below summarizes the movement in the Company's allowance for doubtful accounts (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Balance at December 31, 2015	\$	(843)
Reversal of provision for bad debt		382
Write-offs, net of recoveries		36
Balance at December 31, 2016		(425)
Provision for bad debt		(577)
Write-offs, net of recoveries		376
Balance at December 31, 2017		(626)
Reversal of provision for bad debt		428
Write-offs, net of recoveries		(66)
Balance at December 31, 2018	\$	(264)

Inventories

Inventories were as follows (in thousands):

	December 31,	
	2018	2017
Raw materials	\$ 27,806	\$ 33,400
Work in process	13,044	13,246
Finished goods ⁽¹⁾	11,309	20,655
	\$ 52,159	\$ 67,301

(1) Included in finished goods was \$5.6 million and \$7.1 million of inventory at customer vendor managed inventory locations at December 31, 2018 and 2017, respectively.

Assets held for sale

In December 2018, the Company entered into an agreement with Joint Stock Company Rusnano, a related party, for Joint Stock Company Rusnano group to purchase the 100% interest in the operations of NeoPhotonics Corporation, LLC, the Company's manufacturing operations in Russia. In 2018, the Company recorded additional restructuring expense of \$1.6 million for the Rusnano payment derivative related to these operations.

As of December 31, 2018, the Company reclassified assets with carrying value of \$3.0 million as held for sale primarily consisting of \$2.5 million of property, plant and equipment and \$0.5 million of prepaid expenses and other current assets. The estimated fair value less direct costs of sale approximates the related carrying value. The balance for liabilities held for sale as of December 31, 2018 was immaterial and was primarily included in accrued and other current liabilities.

Prepaid expenses and other current assets

Prepaid expenses and other current assets were as follows (in thousands):

	December 31,	
	2018	2017
Prepaid taxes and taxes receivable	\$ 5,461	\$ 15,162
Transition services agreement receivable (see Note 10)	11,999	12,817
Deposits and other prepaid expenses	3,020	4,138
Other receivable	6,125	4,118
	\$ 26,605	\$ 36,235

Property, plant and equipment, net

Property, plant and equipment, net were as follows (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

	December 31,	
	2018	2017
Land	\$ 3,157	\$ 3,083
Buildings	23,379	24,102
Machinery and equipment	187,746	189,527
Furniture, fixtures, software and office equipment	10,201	9,948
Leasehold improvements	22,000	26,007
	<u>246,483</u>	<u>252,667</u>
Less: Accumulated depreciation	(146,393)	(125,102)
	<u>\$ 100,090</u>	<u>\$ 127,565</u>

Depreciation expense was \$29.9 million, \$27.0 million and \$17.9 million for the years ended December 31, 2018, 2017 and 2016, respectively. In 2017, the Company wrote off certain leasehold improvements in its facilities in California and recorded a restructuring charge of \$0.1 million in connection with the Company's restructuring actions. Purchases of property, plant and equipment unpaid as of December 31, 2018, 2017 and 2016 was \$1.5 million, \$10.0 million and \$16.1 million, respectively.

Accrued and other current liabilities

Accrued and other current liabilities were as follows (in thousands):

	December 31,	
	2018	2017
Employee-related	\$ 14,899	\$ 12,990
Transition services agreement payables (see Note 10)	11,769	11,222
Asset sale related contingent liabilities (see Note 10)	6,751	7,135
Income and other taxes payable	1,580	542
Deferred revenue, current	1,114	939
Accrued warranty	672	1,334
Rusnano payment derivative	2,000	—
Accrued litigation settlement	2,645	—
Other accrued expenses	8,858	9,080
	<u>\$ 50,288</u>	<u>\$ 43,242</u>

Accrued warranty

The table below summarizes the movement in the warranty accrual, which is included in accrued and other current liabilities (in thousands):

	Years ended December 31,		
	2018	2017	2016
Beginning balance	\$ 1,334	\$ 678	\$ 1,175
Warranty accruals	399	1,263	102
Settlements	(1,061)	(607)	(599)
Ending balance	<u>\$ 672</u>	<u>\$ 1,334</u>	<u>\$ 678</u>

Other noncurrent liabilities

Other noncurrent liabilities were as follows (in thousands):

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

	December 31,	
	2018	2017
Pension and other employee-related	\$ 4,529	\$ 4,675
Deferred rent	3,058	2,908
Deferred revenue	—	617
Government grant	2,108	1,095
Rusnano payment derivative	—	389
Deferred income tax liabilities	—	106
Capital lease obligation	282	—
Asset retirement obligations and other	3,522	4,285
	\$ 13,499	\$ 14,075

10. Asset sale

In January 2017, the Company completed the sale of its Low Speed Transceiver Products' assets to APAT OE pursuant to an asset purchase agreement dated December 14, 2016 for consideration of approximately \$25.0 million (in RMB equivalent) plus approximately \$1.4 million (in RMB equivalent) post-closing transaction service fees to be received under a transition services agreement with APAT OE in which the Company will provide short-term manufacturing and other specific services pursuant to such agreement. The related supply chain purchase commitments and value-added tax obligations have been assumed by APAT OE. The receivable and payable balances related to the transition service arrangement were \$12.0 million and \$11.8 million, respectively, as of December 31, 2018.

As of December 31, 2016, the balance in assets held for sale was \$13.9 million, consisting of \$13.1 million in inventories and \$0.8 million in property, plant and equipment. As a result of post-closing adjustments, total consideration was reduced by approximately \$3.4 million for inventory. In addition, an immaterial amount of property, plant and equipment was reclassified from assets held for sale. Upon closing, assets sold to APAT OE were approximately \$12.8 million, including approximately \$12.1 million in inventories and \$0.7 million in property, plant and equipment. The adjusted consideration received of approximately \$21.6 million is subject to further reduction of up to \$10.0 million for any indemnification claims. As of December 31, 2018, the Company has a reserve of \$6.8 million within accrued and other current liabilities for warranty claims. The indemnification warranties expired on June 30, 2017. The Company recognized a \$2.2 million gain on the sale of these assets within operating loss in 2017.

All of the Low Speed Transceiver Products were part of the Company's Network Products and Solution product group and included the low speed optical network (PON) products for which the end-of-life plan was announced in mid-2016.

11. Restructuring

In 2017, the Company initiated restructuring actions in order to focus on key growth initiatives and a lower break even revenue level through lower operating expenses and manufacturing costs. Actions included a reduction in force, facilities consolidation and certain asset-related adjustments. The Company recorded \$0.2 million and \$3.1 million in restructuring charges within cost of goods sold and operating expenses in 2018, respectively. The Company recorded \$0.8 million and \$3.9 million in restructuring charges within cost of goods sold and operating expenses in 2017, respectively. Additionally, the Company recorded a charge of \$2.0 million to cost of goods sold in 2017 for discontinued product inventory write-downs related the Company's decisions to end-of-life certain products.

	Employee Severance	Facilities Consolidation	Asset-Related	Others	Total
Restructuring obligations December 31, 2017	\$ —	\$ 1,580	\$ 43	\$ —	\$ 1,623
Charges	637	29	1,021	1,616	3,303
Cash payments	(196)	(840)	(6)	(5)	(1,047)
Non-cash settlements and other	(5)	—	(1,058)	—	(1,063)
Restructuring obligations December 31, 2018	\$ 436	\$ 769	\$ —	\$ 1,611	\$ 2,816

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

12. Debt

The table below summarizes the carrying amount and weighted average interest rate of the Company's debt (in thousands, except percentages):

	December 31, 2018		December 31, 2017	
	Carrying Amount	Interest Rate	Carrying Amount	Interest Rate
Note payable to Shanghai Pudong Development Bank	\$ —	—%	\$ 17,000	4.10%
Note payable to China CITIC Bank	—	—%	17,000	4.00%
Notes payable to suppliers	4,795		1,607	
Total notes payable and short-term borrowing	\$ 4,795		\$ 35,607	
Long-term debt, current and non-current:				
Borrowing under Wells Fargo Credit Facility	\$ 35,961	4.41%	\$ 30,018	3.29%
Mitsubishi Bank loans	11,094	1.05%-1.45%	16,924	1.05% -1.45%
Mitsubishi Bank and Yamanashi Chou Bank loan	6,898	1.10%	—	
Unaccreted discount and issuance costs within current portion of long-term debt	(161)		(86)	
Unaccreted discount and issuance costs within long-term debt, net of current portion	(441)		(295)	
Total long-term debt, net of unaccreted discount and issuance costs	\$ 53,351		\$ 46,561	
Reported as:				
Current portion of long-term debt	\$ 2,897		\$ 6,005	
Long-term debt, net of current portion	50,454		40,556	
Total long-term debt, net of unaccreted discount and issuance costs	\$ 53,351		\$ 46,561	

Notes payable and short-term borrowing

The Company regularly issues notes payable to its suppliers in China. These notes are supported by non-interest bearing bank acceptance drafts issued under the Company's existing line of credit facilities and are due three to six months after issuance. As a condition of the notes payable arrangements, the Company is required to keep a compensating balance at the issuing banks that is a percentage of the total notes payable balance until the amounts are settled. As of December 31, 2018, the Company's subsidiary in China had two line of credit facilities with banking institutions:

- Under the first line of credit facility with Shanghai Pudong Development Bank, the Company can borrow up to RMB 120.0 million (\$17.4 million) for short-term loans at varying interest rates, or up to approximately RMB 240.0 million (\$34.9 million) for bank acceptance drafts (with up to 50% compensating balance requirement). This line of credit facility expires in November 2021. In November 2017, the Company borrowed \$17.0 million under this line which bears interest at 4.1%, which was repaid in May 2018.
- Under the second line of credit facility with Shanghai Pudong Development Bank, which expires in November 2021, the Company can borrow up to RMB 30.0 million (\$4.4 million) for short-term loans at varying interest rates, or up to approximately RMB 60.0 million (\$8.7 million) for bank acceptance drafts (with up to 50% compensating balance requirement).

In December 2017, the Company's subsidiary in China entered into a third line of credit facility with China CITIC Bank in China, which expired in November 2018. The purpose of the credit facility was to provide short-term borrowings, bank acceptance drafts and letters of credits. Under this credit facility, the Company could borrow up to approximately RMB 250 million (\$36.4 million) at varying interest rates, or up to approximately RMB 390.6 million (\$56.8 million) for bank acceptance drafts (with up to 36% compensating balance requirement). In February 2018, the Company borrowed \$17.0 million under this line which bore interest at 4.7%. The amount of \$17.0 million under this line was repaid in August 2018.

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

The Company had a line of credit facility previously with China CITIC Bank in China which expired during September 2017. In July 2017, the Company borrowed \$17.0 million under this line which bore interest at LIBOR plus 2.55%. The amount of \$17.0 million under this line was repaid to CITIC Bank in January 2018.

Under these line of credit facilities, the non-interest bearing bank acceptance drafts issued in connection with the Company's notes payable to its suppliers in China, had an outstanding balance of \$4.8 million and \$1.6 million as of December 31, 2018 and December 31, 2017, respectively. In addition to the outstanding notes payable, three letters of credit totaling \$1.6 million were issued to its suppliers in 2016 for equipment purchases delivered by December 2016. These letters of credit required a 30% compensating balance. As of December 31, 2016, the outstanding balance of these letters of credit was immaterial and was fully repaid as of December 31, 2018.

As of December 31, 2018 and December 31, 2017, compensating balances relating to bank acceptance drafts and letters of credit issued to suppliers and the Company's subsidiaries totaled \$2.6 million and \$0.5 million, respectively. Compensating balances are classified as restricted cash on the Company's consolidated balance sheets.

In China, when there is a case pending in judicial court, banks may choose to limit borrowing against existing credit lines, regardless of the legitimacy of the case. The Company has a dispute pending with APAT OE in judicial court (See Note 14). The Company does not expect to make any additional draws against its credit facilities in China until this matter is resolved.

Credit Facilities

The Company had a credit agreement, as amended with the Comerica Bank as lead bank in the U.S. (the "Comerica Bank Credit Facility") with a borrowing capacity of up to \$30.0 million. In January 2017, the Company amended the Comerica Bank Credit Facility to extend the maturity to April 30, 2017 and to remove the covenant related to EBDITA. In April 2017, the Company amended the Comerica Bank Credit Facility to extend the maturity date to July 31, 2017 and to add a financial covenant that required maintenance of a modified EBITDA. In June 2017, the Company amended the Comerica Bank Credit Facility to extend the maturity to August 31, 2017, to allow NeoPhotonics China to borrow up to \$17.0 million, to limit the indebtedness under the facility to \$20.0 million and to modify the EBITDA requirement. In August 2017, the Credit Facility was further amended to extend the maturity to September 30, 2017. Borrowings under the Comerica Bank Credit Facility bore interest at an interest rate option of a base rate as defined in the agreement plus 1.75% or LIBOR plus 2.75%. The base rate was the greater of (a) the effective prime rate, (b) the Federal Funds effective rate plus one percent, and (c) the daily adjusting LIBOR rate plus one percent.

In September 2017, the Company entered into a revolving line of credit agreement with Wells Fargo as the administrative agent for a lender group (the "Wells Fargo Credit Facility" or "Credit Facility"), and the amount outstanding under the Comerica Bank Credit Facility was paid in full.

The Wells Fargo Credit Facility provides for borrowings equal to the lower of (a) a maximum revolver amount of \$50.0 million, or (b) an amount equal to 80% - 85% of eligible accounts receivable plus 100% of qualified cash balances up to \$15.0 million, less certain discretionary adjustments ("Borrowing Base"). The maximum revolver amount may be increased by up to \$25.0 million, subject to certain conditions. At closing, \$50.0 million was available, of which \$30.0 million was drawn. The Company used \$20.0 million of this amount to pay the principal and interest due under the Comerica Bank Credit Facility, which has since been terminated.

The Credit Facility matures on June 30, 2022 and borrowings bear interest at an interest rate option of either (a) the LIBOR rate, plus an applicable margin ranging from 1.50% to 1.75% per annum, or (b) the prime lending rate, plus an applicable margin ranging from 0.50% to 0.75% per annum. The Company is also required to pay a commitment fee equal to 0.25% of the unused portion of the Credit Facility.

The Credit Facility agreement ("Agreement") requires prepayment of the borrowings to the extent the outstanding balance is greater than the lesser of (a) the most recently calculated Borrowing Base, or (b) the maximum revolver amount. The Company is required to maintain a combination of certain defined cash balances and unused borrowing capacity under the Credit Facility of at least \$20.0 million, of which at least \$5.0 million shall include unused borrowing capacity. The Agreement also restricts the Company's ability to dispose of assets, permit change in control, merge or consolidate, make acquisitions, incur indebtedness, grant liens, make investments and make certain restricted payments. Borrowings under the Credit Facility are collateralized by substantially all of the Company's assets. The Company was in compliance with the covenants of this Credit Facility as of December 31, 2018. As of December 31, 2018, the outstanding balance under the Credit Facility was \$36.0 million and the weighted average rate under the LIBOR option was 4.41%. The remaining borrowing capacity as of December

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

31, 2018 was \$14.0 million, of which \$5.0 million is required to be maintained as unused borrowing capacity. The Company repaid \$5.0 million in January 2019, which was borrowed in December 2018.

Mitsubishi Bank Loans

On February 25, 2015, the Company entered into certain loan agreements and related agreements with MUFG Bank, Ltd. (the "Mitsubishi Bank") that provided for (i) a term loan in the aggregate principal amount of 500 million Japanese Yen (the "JPY") (\$4.4 million) (the "Term Loan A") and (ii) a term loan in the aggregate principal amount of one billion JPY (\$9.1 million) (the "Term Loan B" and together with the Term Loan A, the "2015 Mitsubishi Bank Loans"). The Mitsubishi Bank Loans are secured by a mortgage on certain real property and buildings owned by our Japanese subsidiary. Interest on the 2015 Mitsubishi Bank Loans accrues and is paid monthly based upon the annual rate of the monthly Tokyo Interbank Offer Rate (TIBOR) plus 1.40%. The Term Loan A requires interest only payments until the maturity date of February 23, 2018, with a lump sum payment of the aggregate principal amount on the maturity date. The Term Loan B requires equal monthly payments of principal equal to 8,333,000 JPY until the maturity date of February 25, 2025, with a lump sum payment of the balance of 8,373,000 JPY on the maturity date. Interest on the Term Loan B is accrued based upon monthly TIBOR plus 1.40% and is secured by real estate collateral. In conjunction with the execution of the Bank Loans, the Company paid a loan structuring fee, including consumption tax, of 40,500,000 JPY (\$0.4 million). The Term Loan A of 500 million JPY (approximately \$4.4 million) was repaid to the Mitsubishi Bank in January 2018.

The 2015 Mitsubishi Bank Loans contain customary representations and warranties and customary affirmative and negative covenants applicable to the Company's Japanese subsidiary, including, among other things, restrictions on cessation in business, management, mergers or acquisitions. The 2015 Mitsubishi Bank Loans contain financial covenants relating to minimum net assets, maximum ordinary loss and a dividends covenant. Outstanding principal balance for Term Loan B and unamortized debt issuance costs were approximately 616.8 million JPY (approximately \$5.6 million) and 66.2 million JPY (approximately \$0.6 million), respectively, as of December 31, 2018. The Company was in compliance with the related covenants as of December 31, 2018 and December 31, 2017.

In March 2017, the Company entered into a loan agreement and related agreements with the Mitsubishi Bank for a term loan of 690 million JPY (approximately \$6.3 million) (the "2017 Mitsubishi Bank Loan") to acquire manufacturing equipment for its Japanese subsidiary. This loan is secured by the manufacturing equipment owned by the Company's subsidiary in Japan. Interest on the 2017 Mitsubishi Bank Loan is based on the annual rate of the monthly TIBOR rate plus 1.00%. The 2017 Mitsubishi Bank Loan matures on March 29, 2024 and requires monthly interest and principal payments over 72 months commencing in April 2018. The loan contains customary covenants relating to minimum net assets, maximum ordinary loss and a dividends covenant. The Company was in compliance with these covenants as of December 31, 2018. The loan was available from March 31, 2017 to March 30, 2018 and 690 million JPY (approximately \$6.3 million) under this loan was fully drawn in March 2017.

Mitsubishi Bank and Yamanashi Chou Bank loan

In January 2018, the Company entered into a term loan agreement with Mitsubishi Bank and The Yamanashi Chou Bank, Ltd. for a term loan in the aggregate principal amount of 850 million JPY (approximately \$7.7 million) (the "Term Loan C"). The purpose of the Term Loan C is to obtain machinery for the core parts of the manufacturing line and payments for related expenses by the Company's subsidiary in Japan. The Term Loan C was available from January 29, 2018 to January 29, 2025. The full amount of the Term Loan C was drawn in January 2018. Interest on the Term Loan C is based upon the annual rate of the three months TIBOR rate plus 1.00%. The Term Loan C requires quarterly interest payments, along with the principal payments, over 82 months commencing in April 2018. The Term Loan C loan agreement contains customary representations and warranties and customary affirmative and negative covenants applicable to the Japanese Subsidiary, including, among other things, restrictions on cessation in business, management, mergers or acquisitions. The Term Loan C loan agreement contains financial covenants relating to minimum net assets and maximum ordinary loss. The Company was in compliance with these covenants as of December 31, 2018.

At December 31, 2018, maturities of long-term debt were as follows (in thousands):

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2019	\$	3,058
2020		3,058
2021		3,058
2022		39,019
2023		3,058
Thereafter		2,702
	<u>\$</u>	<u>53,953</u>

13. Pension Plans*Japan defined benefit pension plans*

In connection with its acquisition of NeoPhotonics Semiconductor in 2013, the Company assumed responsibility for two defined benefit plans that provide retirement benefits to its NeoPhotonics Semiconductor employees in Japan: the Retirement Allowance Plan (“RAP”) and the Defined Benefit Corporate Pension Plan (“DBCPP”). The RAP is an unfunded plan administered by the Company. Effective February 28, 2014, the DBCPP was converted to a defined contribution plan (“DCP”). In May 2014, LAPIS transferred approximately \$2.0 million into the newly formed DCP which was the allowable amount that can be transferred according to the Japanese regulations. LAPIS also paid the Company approximately \$0.3 million in connection with the conversion of the plan. Additionally, the Company transferred the net unfunded projected benefit obligation amount from the DBCPP to the RAP and froze the RAP benefit at the February 28, 2014 amount. Under the RAP, lump sum benefits are provided upon retirement or upon certain instances of termination. In 2014, the Company reclassified \$0.2 million and \$0.1 million from accumulated other comprehensive income to cost of goods sold and operating expenses, respectively.

The funded status of these plans for the years ended December 31, 2018, 2017 and 2016 was as follows (in thousands):

	<u>2018</u>	<u>2017</u>	<u>2016</u>
	<u>RAP</u>	<u>RAP</u>	<u>RAP</u>
Change in projected benefit obligation:			
Projected benefit obligation, beginning of period	\$ 4,616	\$ 4,802	\$ 5,086
Service cost	—	—	—
Interest cost	4	5	11
Benefits paid	(517)	(411)	(551)
Actuarial (gain)/loss	95	32	72
Curtailment/Settlement	—	—	—
Transfer from DBCPP to RAP	—	—	—
Currency translation adjustment	110	188	184
Projected benefit obligation, end of period	<u>\$ 4,308</u>	<u>\$ 4,616</u>	<u>\$ 4,802</u>
Change in plan assets:			
Plan assets at fair value, beginning of period	\$ —	\$ —	\$ —
Employer contributions	—	—	—
Benefits paid	—	—	—
Transfer to DCP	—	—	—
Currency translation adjustment	—	—	—
Plan assets at calculated amount, end of period	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>
Amounts recognized in consolidated balance sheets:			
Accrued and other current liabilities	<u>\$ 257</u>	<u>\$ 488</u>	<u>\$ 393</u>
Other noncurrent liabilities	<u>\$ 4,051</u>	<u>\$ 4,128</u>	<u>\$ 4,409</u>
Amount recognized in accumulated other comprehensive loss:			
Defined benefit pension plans adjustment	<u>\$ 373</u>	<u>\$ 271</u>	<u>\$ 230</u>
Accumulated benefit obligation, end of period	<u>\$ 4,308</u>	<u>\$ 4,616</u>	<u>\$ 4,802</u>

Net periodic pension cost associated with these plans for the years ended December 31, 2018, 2017 and 2016 included the following components (in thousands):

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

	2018	2017	2016
	RAP	RAP	RAP
Service cost	\$ —	\$ —	\$ —
Interest cost	4	5	11
Other	—	—	—
Curtailment/settlement (gain) loss	—	—	—
Net periodic pension costs	\$ 4	\$ 5	\$ 11

The projected and accumulated benefit obligations for the RAP were calculated as of December 31, 2018 and 2017 using a discount rate assumption of 0.1% and 0.1%, respectively.

Estimated future benefit payments under the RAP are as follows (in thousands):

2019	\$ 188
2020	513
2021	626
2022	295
2023	—
2024 - 2026	1,631
Thereafter	1,055
	<u>\$ 4,308</u>

401(k) Plan

The Company maintains a savings and retirement plan qualified under Section 401(k) of the Internal Revenue Code of 1986, as amended (the "IRC"). The Company currently matches a portion of all eligible employee contributions which vest immediately. The Company's matching contributions to the plan totaled \$0.4 million, \$0.5 million and \$0.4 million, respectively, for the years ended December 31, 2018, 2017, and 2016.

14. Commitments and contingencies

Leases

The Company leases various facilities under non-cancelable operating leases expiring through 2027.

On June 13, 2017, the Company entered into an office lease for approximately 39,000 square feet for the Company's current headquarters in San Jose (the "Lease") with a commencement date of June 1, 2017. The Company's existing office lease for the facility was terminated and replaced by the new Lease. Upon commencement, the Lease had an initial term of one hundred and twenty-three (123) months, ending September 30, 2027, (the "Initial Term") with a monthly rental rate of \$41,388, escalating annually to a maximum monthly rental rate of approximately \$72,525 in the last year of the Initial Term. Upon termination of the Lease, the Company anticipates a restoration cost of approximately \$0.7 million.

In September 2016, the Company entered into an office lease for approximately 64,000 square feet of office and laboratory space located adjacent to the Company's current headquarters in San Jose (the "Lease"). The term of the Lease commenced on January 1, 2017. Upon commencement, the Lease has an initial term of one hundred and twenty-nine (129) months, ending on September 30, 2027 (the "Initial Term"), with a monthly rental rate of \$144,000, escalating annually to a maximum monthly rental rate of approximately \$194,000 in the last year of the Initial Term. The Landlord has agreed to provide the office and laboratory space to the Company free of charge for the first nine months of the Initial Term through September 30, 2017. Upon termination of the Lease, the Company anticipates a restoration cost of approximately \$3.1 million.

As of December 31, 2018, the future minimum commitments under the Company's non-cancelable operating leases are as follows (in thousands):

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Years ending December 31,		
2019	\$	3,618
2020		3,113
2021		3,059
2022		3,056
2023		3,049
Thereafter		11,437
	\$	<u>27,332</u>

The total minimum lease commitment amount above does not include minimum sublease rent income of \$1.3 million receivable in the future under non-cancelable sublease agreements.

The Company recognizes rent expense on a straight-line basis over the lease period. Rent expense under the Company's operating leases was \$4.2 million, \$4.6 million and \$2.4 million, respectively, in the years ended December 31, 2018, 2017, and 2016.

Litigation

From time to time, the Company is subject to various claims and legal proceedings, either asserted or unasserted, that arise in the ordinary course of business. The Company accrues for legal contingencies if the Company can estimate the potential liability and if the Company believes it is probable that the case will be ruled against it. If a legal claim for which the Company did not accrue is resolved against it, the Company would record the expense in the period in which the ruling was made. The Company believes that the likelihood of an ultimate amount of liability, if any, for any pending claims of any type (alone or combined) that will materially affect the Company's financial position, results of operations or cash flows is remote. The ultimate outcome of any litigation is uncertain, however, and unfavorable outcomes could have a material negative impact on the Company's financial condition and operating results. Regardless of outcome, litigation can have an adverse impact on the Company because of defense costs, negative publicity, diversion of management resources and other factors.

In January 2010, Finisar Corporation, or Finisar, filed a complaint in the U.S. District Court for the Northern District of California, or the Court, against Source Photonics, Inc., MRV Communications, Inc., Oplink Communications, Inc. and the Company, or collectively, the co-defendants. In the complaint Finisar alleged infringement of certain of its U.S. patents. In 2010 the Company filed an answer to the complaint and counterclaims, asserting two claims of patent infringement and additional claims. The court dismissed without prejudice all co-defendants (including the Company) except Source Photonics, Inc., on grounds that such claims should have been asserted in four separate lawsuits, one against each defendant. This dismissal does not prevent Finisar from bringing a new similar lawsuit against the Company. In 2011 the Company and Finisar agreed to suspend their respective claims and in 2012 the Company and Finisar further agreed to toll their respective claims. While there has been no action on this matter since 2012, the Company is currently unable to predict the outcome of this dispute and therefore cannot determine the likelihood of loss nor estimate a range of possible loss.

In January 2013, the Company was served with a lawsuit, filed in Belgium by a distributor called Laser 2000 Beneluo SA ("Laser 2000") claiming unpaid commissions. The distributor agreement was formally terminated as of January 3, 2012. The Company paid \$492,000 to Laser 2000 as partial settlement of claims and to avoid penalties from the Court and submitted a legal brief to court on September 16, 2013. Laser 2000 filed a response on December 16, 2013 and the Company filed the final rebuttal brief on January 30, 2014. In March 2015, the Belgian Court issued a ruling awarding Laser 2000 approximately one million euros in damages (approximately \$1,100,000 at current exchange rates). The Company did not believe it would ultimately be liable for the full amount of damage and accrued \$0.3 million in March 2015 for estimated probable net litigation expense relating to this matter. The Company appealed this verdict and, in April 2017 settled this case and paid approximately \$250,000.

In December 2016 the Company was served with a lawsuit filed by Lestina International Ltd. ("Lestina"), in Santa Clara County, CA. The lawsuit is regarding a dispute of approximately \$3.0 million related to purchase orders for the Company's Low Speed Transceiver Products that was soon thereafter sold by the Company to APAT OE in January 2017. The purchase orders in question were included in the asset sale and were assumed liabilities by the purchaser of the business. The parties engaged in extensive negotiations and in January 2019, the parties agreed to a proposed settlement which was placed on the record of the Superior Court of Santa Clara County agreeing that NeoPhotonics Dongguan Co., Ltd. ("NeoDongguan") (the Company's wholly owned subsidiary located in China) would pay to Lestina a total of \$2.2 million. Upon Lestina's receipt of full payment, Lestina will ship to NeoDongguan the remaining parts from the original purchase orders. The Company has

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agreed to be a guarantor for NeoDongguan on the payment obligation to Lestina. The \$2.2 million settlement shall be paid in two payments of \$1.2 million in February 2019 and \$1.0 million in June 2019 respectively.

In April 2018, APAT OE filed three lawsuits in the Qianhai Court in Shenzhen, China against NeoPhotonics (China) Co., Ltd., NeoPhotonics Dongguan Co. Ltd. (collectively "Neo China") and NeoPhotonics Corporation claiming approximately twenty million US dollars in damages. The lawsuit is in reference to the sale of the low speed transceiver business to APAT OE from NeoChina. APAT OE claims that the business has been losing money and that APAT OE was not given all of the information about the business they purchased prior to signing the Asset Purchase Agreement ("APA"). In May 2018, counsel on behalf of NeoChina filed a motion objecting to the jurisdiction, claiming that the proper jurisdiction for any dispute between these parties is the Shenzhen Court of International Arbitration and the proper parties to this dispute are NeoChina and APAT OE, pursuant to the APA. In June 2018 a hearing was held in the Qianhai Court in Shenzhen, China. In August 2018, the Court ruled in favor of APAT OE. In September 2018, NeoChina filed an appeal with the Intermediate Court of Shenzhen, which held a hearing on the matter in October 2018. At that hearing arguments were heard regarding the proper jurisdiction for all disputes between NeoChina and APAT OE. NeoChina argued that all disputes between the parties should be decided in the Shenzhen Court of Arbitration per the APA between the parties. APAT OE argued that the Qianhai Court is the appropriate jurisdiction. In November 2018 the Intermediate Court of Shenzhen reversed the lower court's (Qianhai Court of Shenzhen) judgment and ruled that the dispute shall be governed by the Shenzhen Court of International Arbitration, in favor of NeoChina, dismissing in totality the litigation against NeoChina. The litigation continues against the Company; however the Company's position is that there is no existing contract between APAT OE and the Company and therefore no basis for litigation. The Company is unable to predict the outcome of this matter.

In December 2018, APAT OE applied to the Intermediate Court of Shenzhen for a pre-trial preservation order. On the same day the Court issued the order to preserve approximately \$29.0 million of Neo China assets. The order is temporary. If APAT OE does not file a lawsuit against NeoChina within 30 days of the order, or if the lawsuit is dismissed the order will then be null and void. In January 2019, there was an additional pre-trial preservation order to preserve approximately \$3.8 million of Neo China assets.

In the first quarter of 2019, APAT OE filed a lawsuit in the Intermediate Court of Shenzhen against Neo China, NeoPhotonics Corporation Limited (HK), Novel Centennial Limited (BVI) and NeoPhotonics Corporation, asserting claims and damages against all parties in the amount of approximately \$36.0 million. The claims include but are not limited to allegations that defendants are responsible for a customer terminating APAT OE's business, that defendants are responsible for APAT OE's inability to complete a low speed business-related project and that defendants are responsible for loss of profits by APAT OE using a contract manufacturer that Neo China had been using prior to the sale. The Company is unable to predict the outcome of this matter.

APAT Arbitration

In June 2017, APAT OE filed an arbitration claim against NeoChina (collectively both of the Company's China subsidiaries), claiming that approximately \$1.5 million of the inventory that was sold to APAT OE by NeoChina in the APA was aged inventory and of no value. NeoChina brought a counterclaim against APAT OE. The arbitration was heard in the Shenzhen Court of International Arbitration in August 2017. In October 2017, NeoChina was informed that they were successful in the defense of the dispute and were also successful in their counterclaim against APAT OE. NeoChina was awarded approximately RMB700,000 (approximately \$110,000) in compensatory damages and attorney fees as well as having the approximately \$1.5 million claim against NeoChina rejected in its entirety.

In April 2018, APAT OE filed a Notice of Judicial Review of the arbitration judgment in the Shenzhen Intermediate Court in Shenzhen, China. The case was heard in May 2018, and NeoChina was successful in disputing the Judicial Review, which means that the arbitration judgment against APAT OE and in favor of NeoChina stands.

In July 2018 NeoChina applied together to the Shenzhen Intermediate Court for enforcement of the previous arbitration ruling because APAT OE had refused to perform the arbitral award. In October 2018 the Court enforced the award officially closing this arbitration matter.

In July 2018 NeoChina filed an arbitration against APAT OE in the Shenzhen Court of International Arbitration, claiming approximately \$12.0 million in damages against APAT OE as related to liability under the APA. This case is awaiting a hearing date.

In November 2018, APAT OE filed an additional arbitration against NeoChina and the Company in the Shenzhen Court of International Arbitration, claiming approximately \$7.8 million for liability under the APA. This case is awaiting a hearing date.

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In February 2019, NeoChina filed a claim in the Shenzhen Court of International Arbitration against APAT OE and Zhejiang Merchants Property Insurance Company for losses and damages to NeoChina in the amount of approximately RMB350,000 related to the recent pre-trial property preservations filed by APAT OE and related legal fees.

Indemnifications

In the normal course of business, the Company enters into agreements that contain a variety of representations and warranties and provide for general indemnification. The Company's exposure under these agreements is unknown because it involves claims that may be made against the Company in the future, but have not yet been made. To date, the Company has not paid any claims or been required to defend any action related to its indemnification obligations. However, the Company may record charges in the future as a result of these indemnification obligations.

In November 2016 Oyster Communications, Inc. filed nine patent lawsuits against several defendants in the U.S. District Court for the Eastern District of Texas, including one against Cisco Systems, Inc ("Cisco"). One defendant successfully transferred their case to the U.S. District Court for the Northern District of California. Additional defendants requested venue changes are still pending. The Company was not named as a defendant in any of the lawsuits. In July 2017, Cisco notified the Company that it would be seeking indemnification from the Company for claims against Cisco arising from the lawsuits and the parties engaged in discussions and negotiations. In September 2018, the Company and Cisco signed a settlement agreement under which the Company agreed to pay to Cisco \$300,000 to be paid by January 31, 2019 and \$150,000 in product credits to be applied during calendar year 2019. This settlement resolves Cisco's indemnification claims against the Company in this matter.

Purchase obligations

The Company has open purchase orders with its suppliers for the purchase of inventory and other items in the ordinary course of its business. As of December 31, 2018, the Company's estimate of outstanding amounts under these purchase orders was approximately \$50.9 million, primarily expected to be purchased within the next 12 months. Certain of these open purchase orders may be cancellable without penalty.

Penalty Payment Derivative

In connection with a private placement transaction with Joint Stock Company "Rusnano" (formerly Open Joint Stock Company "RUSNANO"), or Rusnano, in 2012, the Company agreed to certain performance obligations including establishing a wholly-owned subsidiary in Russia and making a \$30.0 million investment commitment (the "Investment Commitment") towards the Company's Russian operations, which could be partially satisfied by cash and/or non-cash investment inside or outside of Russia and/or by way of non-cash asset transfers.

The Rights Agreement as amended in 2015 (the "Amended Rights Agreement") limits the maximum amount of penalties and/or exit fee (the "Rusnano Payment") to be paid by the Company to \$5.0 million in the aggregate and allows such payment to be reduced when certain milestones are met over time. The Amended Rights Agreement also provides for an updated investment plan for the Company's Russian subsidiaries that includes non-cash transfer of licensing rights to intellectual property, non-cash transfers of existing equipment and commitments to complete the remaining investment milestones through 2019.

As of December 31, 2018, the remaining Investment Commitment was approximately \$6.7 million to be invested at any time on or before December 31, 2019. At any point between December 31, 2018 and December 31, 2019, the Company may elect to pay a \$2.0 million exit fee to terminate any remaining obligations associated with the Investment Commitment.

Rusnano has non-transferable veto rights over the Company's Russian subsidiaries' annual budget during the investment period and must approve non-cash asset transfers to be made in satisfaction of the Investment Commitment. The Company accounted for the Rusnano Payment as an embedded derivative instrument. The fair value of the penalty payment derivative has been estimated at the date of the original common stock sale (April 27, 2012) and at each subsequent balance sheet date using a probability-weighted discounted future cash flow approach using unobservable inputs, which are classified as Level 3 within the fair value hierarchy. The primary inputs for this approach include the probability of achieving the Investment Commitment and a discount rate that approximates the Company's incremental borrowing rate. After the initial measurement, changes in the fair value of this derivative are recorded in other income (expense), net. The estimated fair value of this derivative was \$2.0 million as of December 31, 2018 and \$0.4 million as of December 31, 2017. As of December 31, 2018, and December 31, 2017, the derivative was reported within Accrued and other current liabilities and other noncurrent liabilities, respectively on the Company's consolidated balance sheets. See Note 9.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

In December 2018, the Company signed a definitive agreement with Rusnano to sell the Company's 100% interest in NeoPhotonics Corporation, LLC, the subsidiary for the Company's manufacturing operations in Russia, for approximately book value. The purchase price to be paid by Rusnano will consist of approximately \$3.0 million in cash and \$1.0 million in cancellation of the remaining penalty payment that would otherwise be owed to Rusnano as consideration for the Company's obligations to provide manufacturing process transition to NeoPhotonics Corporation, LLC.

15. Stockholders' Equity

Common stock

As of December 31, 2018, the Company had reserved 7,486,096 shares of common stock for issuance under its stock plans and 474,462 shares of common stock for issuance under its employee stock purchase plan.

Resale Registration Statement

In December 2014, the Company entered into a Commitment to File a Registration Statement and Related Waiver of Registration Rights, whereby Rusnano waived certain registration rights in connection with a potential offering by the Company of shares of the Company's common stock, and the Company committed to file with the U.S. Securities and Exchange Commission a resale registration statement on Form S-1 covering the resale of all shares of the Company's common stock held by Rusnano. In each of 2015 and 2016, the Company filed such resale registration statement, which registered 4,972,905 shares of the Company's common stock, at a par value of \$0.0025 per share, held by Rusnano. The Company does not receive any proceeds from any sales of the Company's common stock held by Rusnano (See Note 14).

Follow-On Public Offering

In 2015, the Company completed a follow-on public offering, in which the Company sold 6,866,689 shares of its common stock, including 895,655 shares of common stock sold upon the exercise in full of the overallotment option by the underwriters, at a public offering price of \$7.25 per share. The Company raised approximately \$45.6 million, net of underwriting discounts of \$3.0 million and other offering expenses of approximately \$1.2 million.

Accumulated Other Comprehensive Income (Loss)

The following table shows the components of accumulated other comprehensive income (loss), net of taxes, as of December 31, 2018 and 2017 (in thousands):

	December 31, 2018	December 31, 2017
Foreign currency translation adjustments	\$ (6,897)	\$ 567
Unrealized loss on available-for-sale securities	—	(1)
Defined benefit pension plan adjustment	(229)	(168)
	<u>\$ (7,126)</u>	<u>\$ 398</u>

No material amounts related to available-for-sale securities or the defined benefit pension plan were reclassified out of accumulated other comprehensive income (loss) during the years ended December 31, 2018, 2017 or 2016.

Accumulated Deficit

Approximately \$9.0 million and \$8.8 million of the Company's retained earnings within its accumulated deficit at December 31, 2018 and 2017, respectively, was subject to restriction due to a requirement that its subsidiaries in China set aside at least 10% of their respective accumulated profits each year to fund statutory common reserves as well as allocate a discretionary portion of their after-tax profits to their staff welfare and bonus fund.

16. Stock-based compensation

Equity incentive programs

2004 Stock Option Plan

NEOPHOTONICS CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

In March 2004, the Company adopted the 2004 Stock Option Plan (the “2004 Plan”) for the benefit of its eligible employees, consultants and independent directors. In February 2011, in connection with the closing of the Company’s initial public offering and execution of the associated underwriting agreement, shares authorized for issuance under the 2004 Plan were cancelled (except for those shares reserved for issuance upon exercise of outstanding stock options). As of December 31, 2018, options to purchase 273,685 shares were outstanding under the 2004 Plan and no shares were available for future grant.

2007 Stock Appreciation Grants Plan

In October 2007, the Company adopted its 2007 Stock Appreciation Grants Plan (the “2007 Plan”). The 2007 Plan provides for the grant of units (“stock appreciation units”) entitling the holder upon exercise to receive cash in an amount equal to the amount by which the Company’s common stock has appreciated in value. Each stock appreciation unit entitles a participant to a cash payment in the amount of the excess of the fair market value of a share of common stock on the exercise date over the fair market value of a share of common stock on the award date.

The total appreciation available to a participant from the exercise of an award is equal to the number of stock appreciation units being exercised, multiplied by the amount of appreciation per stock appreciation unit. The stock appreciation units granted under the 2007 Plan were primarily granted to employees or consultants of the Company’s subsidiaries in China.

As of December 31, 2018, 27,872 stock appreciation units were outstanding, all of which were vested. The Company does not intend to grant additional stock appreciation units under the 2007 Plan.

2010 Equity Incentive Plan

In April 2010, the Company adopted its 2010 Equity Incentive Plan (the “2010 Plan”). The 2010 Plan will terminate on April 13, 2020, unless sooner terminated by the board of directors.

The 2010 Plan provides for the grant of incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, market-based stock awards, and other forms of equity compensation, or collectively, stock awards, all of which may be granted to employees, including officers, and to non-employee directors and consultants. Additionally, the 2010 Plan provides for the grant of market-based cash awards. Incentive stock options may be granted only to employees. All other awards may be granted to employees, including officers, and to non-employee directors and consultants.

Under the terms of the 2010 Plan, awards may be granted at prices not less than 100% of the fair value of the Company’s common stock, as determined by the Company’s board of directors, on the date of grant for an incentive stock option and not less than 85% of the fair value of the Company’s common stock on the date of grant for a non-qualified stock option. Options vest over a period of time as determined by the board of directors, generally over a three to four year period, and expire ten years from date of grant.

Initially, the aggregate number of shares of the Company’s common stock that may be issued pursuant to stock awards under the 2010 Plan was 865,420 shares. The number of shares of the Company’s common stock reserved for issuance under the 2010 Plan automatically increase on January 1st each year, starting on January 1, 2012 and continuing through January 1, 2020, by 3.5% of the total number of shares of the Company’s common stock outstanding on December 31 of the preceding calendar year, or such lesser number of shares of common stock as determined by the Company’s board of directors. The maximum number of shares that may be issued pursuant to the exercise of incentive stock options under the 2010 Plan is 8,000,000 shares. As of December 31, 2018, stock options to purchase and restricted stock units to convert to a total of 5,553,442 shares of common stock were outstanding under the 2010 Plan and 835,575 shares were reserved for future issuance.

2010 Employee Stock Purchase Plan

In February 2011, the Company adopted its 2010 Employee Stock Purchase Plan (the “2010 ESPP”). The 2010 ESPP was implemented through a series of offerings of purchase rights to eligible U.S. employees. The offering period is for 12 months beginning November 16th of each year, with two purchase dates on May 15th and November 15th.

The 2010 ESPP initially authorized the issuance of 342,568 shares of the Company’s common stock pursuant to purchase rights granted to employees or to employees of designated affiliates. The number of shares of common stock reserved for issuance automatically increase on January 1st of each year, starting January 1, 2012 and continuing through January 1, 2020, in an amount equal to the lesser of (1) 3.5% of the total number of shares of common stock outstanding on December 31st of the preceding calendar year, (2) 600,000 shares of common stock or (3) such lesser number of shares of common stock as

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

determined by the Company's board of directors. As of December 31, 2018, the Company had 474,462 shares reserved for future issuance.

2011 Inducement Award Plan

In September 2011, the Company adopted its 2011 Inducement Award Plan (the "2011 Plan"). The 2011 Plan provides for awarding options, stock appreciation rights, restricted stock grants, restricted stock units and other awards to new employees of the Company and its affiliates, including as a result of future business acquisitions. All options under this plan will be designated as non-statutory stock options.

The number of shares initially reserved for issuance under the 2011 Plan was 750,000 shares. The exercise price of awards shall be not less than 100% of the fair market value of the Company's common stock on the date of grant. Each stock appreciation right grant will be denominated in shares of common stock equivalents. Options and stock appreciation rights have a maximum term of ten years measured from the date of grant, subject to earlier termination following the individual's cessation of service with the Company. In 2015, an additional 100,000 shares were authorized for issuance by the Company's board of directors. As of December 31, 2018, stock options to purchase and restricted stock units to convert to a total of 556,646 shares of common stock were outstanding under the 2011 Plan and 266,748 shares were reserved for future issuance.

Determining Fair Value

The Company estimated the fair value of certain stock-based awards using a Black-Scholes-Merton valuation model with the following assumptions:

	Years ended December 31,		
	2018	2017	2016
<u>Stock options</u>			
Weighted-average expected term (years)	6.02	5.99	5.75
Weighted-average volatility	65%	65%	65%
Risk-free interest rate	2.27%-2.62%	2.02%-2.08%	1.01%-1.76%
Expected dividends	— %	— %	— %
<u>Stock appreciation units</u>			
Weighted-average expected term (years)	1.94	2.30	2.77
Weighted-average volatility	66%	69%	61%
Risk-free interest rate	1.03%-2.81%	0.51%-1.62%	0.45%-1.47%
Expected dividends	0	— %	— %
<u>ESPP</u>			
Weighted-average expected term (years)	0.72	0.72	0.73
Weighted-average volatility	61%	61%	54%
Risk-free interest rate	1.93%-2.59%	0.91%-1.31%	0.39%-0.45%
Expected dividends	— %	— %	— %

Expected term. The expected term for stock options was estimated using the Company's historical exercise behavior and expected future exercise behavior. Vested stock appreciation units first became exercisable upon the expiration of the lock-up period associated with the initial public offering. Therefore, the Company estimated the term of the award based on an average of the weighted-average exercise period and the remaining contractual term. The expected term for the ESPP represents the period of time from the beginning of the offering period to the purchase date.

Volatility. Due to the limited history of the trading of the Company's common stock since the initial public offering in February 2011, the expected volatility used by the Company was based on a combination of its own volatility and the volatility of similar entities through end of 2016. In evaluating similarity, factors such as industry, stage of life cycle, size, and financial leverage were taken into consideration. The term over which volatility was measured was commensurate with the expected term. Starting 2017, the volatility assumption is based on the historical volatility of our common stock over the expected term of the stock options.

Risk-free interest rate. The risk-free rate that the Company uses in the Black-Scholes-Merton option valuation model is based on U.S. Treasury zero-coupon issues with remaining terms similar to the expected term on the options.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Expected dividends. The Company has never declared or paid any cash dividends and does not plan to pay cash dividends in the foreseeable future, and, therefore, used an expected dividend yield of zero in the valuation model.

Stock-Based Compensation Expense

The following table summarizes the stock-based compensation expense recognized for the years ended December 31, 2018, 2017 and 2016. Unamortized stock-based compensation costs capitalized as part of inventory were immaterial in each of the periods presented (in thousands):

	Years ended December 31,		
	2018	2017	2016
Cost of goods sold	\$ 2,596	\$ 1,098	\$ 3,130
Research and development	3,570	2,491	4,760
Sales and marketing	3,248	1,697	4,105
General and administrative	4,728	2,920	5,081
	<u>\$ 14,142</u>	<u>\$ 8,206</u>	<u>\$ 17,076</u>

2014 Stock Option and Stock Appreciation Rights Repricing Offer

On December 18, 2014, the Company completed an offer to certain of its current employees (or engaged as a consultant to the Company) to receive the opportunity to reduce the exercise price of certain outstanding eligible options or eligible stock appreciation rights to the closing trading price of the Company's common stock on December 18, 2014, in exchange for such holders' agreement to accept a new vesting schedule (the "Repricing Offer"). The eligible stock options and stock appreciation rights covered an aggregate of 2,373,692 shares of the Company's common stock. On December 18, 2014, options to purchase 1,948,631 shares of the Company's common stock and stock appreciation rights to purchase 87,354 shares of the Company's common stock were repriced in the Repricing Offer. The repriced eligible options and eligible stock appreciation rights had a grant date compensation cost, net of forecasted forfeitures, of approximately \$2.6 million, which included incremental compensation cost of approximately \$0.9 million.

The new exercise price per share for each repriced eligible option or eligible stock appreciation right is \$3.50. Each of the repriced eligible options or eligible stock appreciation rights was subject to a new vesting schedule as follows: 50% of the shares subject to such repriced eligible option or eligible stock appreciation right vested and became exercisable on January 1, 2016, and the remaining 50% vested and became exercisable in 12 equal monthly installments on each monthly anniversary thereafter, in each case subject to continued service with the Company on each applicable vesting date; provided, however, that alternative vesting applied to certain eligible options or eligible stock appreciation rights if the expiration date of such eligible options or eligible stock appreciation rights was after January 30, 2016, but on or before January 1, 2017, then 50% of the shares subject to the repriced awards vested and became exercisable on January 1, 2016 and the remaining shares were subject to ratable monthly vesting over the remaining term ending 60 days prior to the expiration date of the repriced awards; if the expiration date of such eligible options or eligible stock appreciation rights was prior to January 30, 2016, then 100% of the shares subject to the repriced awards vested and became exercisable on the 60th day prior to the expiration date.

Stock Option and Restricted Stock Unit Activity

The following table summarizes the Company's stock option and restricted stock unit, or RSU, activity during the year ended December 31, 2018:

	Stock Options			Restricted Stock Units	
	Shares Available for Grant	Number of Shares	Weighted Average Exercise Price	Number of Units	Weighted Average Grant Date Fair Value
Balance at December 31, 2017	959,136	3,933,529	\$ 5.55	2,404,637	\$ 9.02
Authorized for issuance	1,947,667	—	—	—	—
Granted	(2,300,056)	158,116	6.64	1,446,940	6.83
Exercised/Converted	—	(778,811)	4.39	(1,123,893)	8.82
Cancelled/Forfeited	495,576	(110,089)	10.07	(241,656)	8.74
Balance at December 31, 2018	<u>1,102,323</u>	<u>3,202,745</u>	<u>\$ 5.73</u>	<u>2,486,028</u>	<u>\$ 7.87</u>

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

The following table summarizes information about stock options outstanding as of December 31, 2018:

	Options Outstanding			
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in Thousands)
Vested and expected to vest	3,152,837	\$ 5.70	5.31	\$ 4,936,208
Exercisable	2,701,433	\$ 5.32	4.78	\$ 4,864,959

The fair value of options vested during the years ended December 31, 2018, 2017 and 2016 was \$2.3 million, \$1.5 million and \$3.9 million, respectively. The intrinsic value of options vested and expected to vest and exercisable as of December 31, 2018 is calculated based on the difference between the exercise price and the fair value of the Company's common stock as of December 31, 2018. The intrinsic value of options exercised during the years ended December 31, 2018, 2017 and 2016, was \$2.4 million, \$3.0 million and \$9.7 million, respectively.

The weighted-average fair value of options granted was \$4.03, \$4.43 and \$7.05 per share for the years ended December 31, 2018, 2017 and 2016, respectively. At December 31, 2018, there was \$1.8 million of unrecognized stock-based compensation expense for stock options, net of estimated forfeitures, which will be recognized over the remaining weighted-average period of 1.8 years.

Included in the outstanding stock options at December 31, 2018 are 0.8 million shares of market-based stock options granted to key personnel. The fair value of its market-based option grants was \$4.72 for 2015 and \$1.65 for 2014 using a Monte Carlo simulation model with the assumptions discussed above. These options vested in September 2016 as a result of the satisfaction of the market condition requiring the average closing price of the Company's common stock over a period of 20 consecutive trading days to be equal to or greater than \$15.00 per share and the recipients remaining in continuous service with the Company through such period. The Company recorded approximately \$4.8 million in related stock-based compensation expense for these options in 2016.

The following table summarizes information about RSUs outstanding as of December 31, 2018:

	Restricted Stock Units Outstanding			
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in Thousands)
Vested and expected to vest	2,166,565	\$ —	1.26	\$ 14,039,340

The fair value of RSUs vested during the years ended December 31, 2018, 2017 and 2016 was \$9.8 million, \$7.6 million and \$1.6 million, respectively. The intrinsic value of RSUs vested and expected to vest as of December 31, 2018 is calculated based on the fair value of the Company's common stock as of December 31, 2018. The intrinsic value of RSUs converted during the years ended December 31, 2018, 2017 and 2016, was \$7.4 million, \$6.4 million and \$2.8 million, respectively.

The weighted-average fair value of RSUs granted was \$6.83, \$7.86 and \$12.33 per share for the years ended December 31, 2018, 2017 and 2016, respectively. At December 31, 2018, the Company had \$13.2 million of unrecognized stock-based compensation expense for RSUs, net of estimated forfeitures, which will be recognized over the remaining weighted-average period of 2.1 years.

The majority of the Company's RSUs that were converted during the years ended December 31, 2018, 2017 and 2016 were net share settled. Upon each settlement date, RSUs were withheld to cover the minimum withholding tax and the remaining amounts were delivered to the recipient as shares of the Company's common stock. In 2018, 2017 and 2016, the Company withheld 147,572, 126,999 and 49,838 shares, respectively, and remitted cash of \$1.0 million, \$1.0 million and \$0.6 million, respectively, to the appropriate tax authorities.

Market-based Restricted Stock Unit Activity

In 2018, the Company granted 695,000 shares of market-based RSUs to certain employees. These RSUs will vest if the 30-day weighted average closing price of the Company's common stock is equal to or greater than certain price targets per share

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and the recipients remain in continuous service with the Company through such service period. No market-based RSUs were vested/cancelled during 2018.

The weighted average grant-date fair value per share of market-based RSUs granted during 2018 was approximately \$5.82 per share. As of December 31, 2018, the Company had \$2.9 million of unrecognized stock-based compensation expense for RSUs, net of estimated forfeitures, which will be recognized over the remaining weighted-average period of 3.5 years. The fair value of market-based RSUs was measured on the grant date using Monte Carlo simulation model with the following assumptions:

	Years ended December 31,	
	2018	2017
Weighted-average volatility	66%	—%
Risk-free interest rate	2.79%	—%
Expected dividends	—%	—%

Market-based RSUs expire seven years from the date of grant. As of December 31, 2018, the weighted average remaining contractual term for market-based RSUs is 6.5 years.

Stock Appreciation Unit Activity

The following table summarizes the Company's stock appreciation unit activity during the year ended December 31, 2018:

	Stock Appreciation Units	Weighted-Average Exercise Price
Stock appreciation units outstanding as of December 31, 2017	239,824	\$ 4.95
Stock appreciation units exercised	(31,272)	\$ 4.32
Stock appreciation units cancelled	(15,680)	\$ 6.72
Stock appreciation units outstanding as of December 31, 2018	192,872	\$ 4.91

The fair value of stock appreciation units vested was immaterial in 2018 and 2017 and \$3.7 million in 2016. The intrinsic value of stock appreciation units is calculated based on the difference between the exercise price and the fair value of the Company's common stock as of December 31, 2018. Cash paid for stock appreciation units exercised was \$0.1 million in 2018, \$0.2 million in 2017, and \$0.5 million in 2016.

As of December 31, 2018 and 2017, the liability for settlement of stock appreciation units was approximately \$0.6 million and \$0.8 million, respectively, and was included in accrued and other current liabilities on the consolidated balance sheet, based on the fair value of the stock appreciation units, that will be recognized through settlement.

Included in the outstanding stock appreciation units at December 31, 2018 were 0.2 million shares of market-based stock appreciation units granted to key personnel which were granted during 2013. These market-based units vested in September 2016 upon the satisfaction of the market condition requiring the average closing price of the Company's common stock over a period of 20 consecutive trading days to be equal to or greater than \$15.00 per share and the recipients remaining in continuous service with the Company through such period. In 2018, the Company recorded approximately \$0.1 million gain as compared to approximately \$0.3 million gain in 2017, in related stock-based compensation for these stock appreciation units.

Employee Stock Purchase Plan

The Company issued 404,211 shares under the 2010 ESPP during the year ended December 31, 2018. As of December 31, 2018, there was \$0.8 million of unrecognized stock-based compensation expense for stock purchase rights that will be recognized over the remaining offering period, through November 2019.

17. Income taxes -

The provision for income taxes is based upon the income (loss) before income taxes as follows (in thousands):

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	Years Ended December 31,		
	2018	2017	2016
U.S. operations	\$ (43,384)	\$ (52,725)	\$ (10,217)
Non-U.S. operations	1,076	301	13,609
	<u>\$ (42,308)</u>	<u>\$ (52,424)</u>	<u>\$ 3,392</u>

The components of the provision for income taxes consisted of the following (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Current			
Federal	\$ (49)	\$ (144)	\$ (127)
State	36	3	(13)
Foreign	(1,634)	363	(3,925)
	<u>(1,647)</u>	<u>222</u>	<u>(4,065)</u>
Deferred			
Federal	42	4	(24)
State	—	—	—
Foreign	276	(1,135)	492
Total provision	<u>\$ (1,329)</u>	<u>\$ (909)</u>	<u>\$ (3,597)</u>

The provision for income taxes differs from the amount obtained by applying the U.S. federal statutory tax rate as follows (in thousands, except percentages):

	Years Ended December 31,		
	2018	2017	2016
Federal statutory rate	21%	35%	35%
Tax at federal statutory rate	\$ 8,869	\$ 18,354	\$ (1,185)
State taxes, net of federal benefit	36	2	(8)
Mandatory repatriation/Section 956	—	(5,718)	(19)
Nondeductible expenses	(371)	(67)	(727)
Stock-based compensation	(1,079)	(314)	(877)
Change in valuation allowance	(10,094)	16,273	(1,455)
Research and development	914	851	1,175
Foreign rate differences	(697)	(2,819)	(1,215)
Foreign tax credit	49	144	127
Change in prior year deferred balances	1,653	(28,262)	920
Other	(609)	647	(333)
Total provision for income taxes from continuing operations	<u>\$ (1,329)</u>	<u>\$ (909)</u>	<u>\$ (3,597)</u>

Change in prior year deferred balances of \$28.3 million include approximately \$30.0 million related to remeasurement of U.S. federal deferred tax assets from corporate tax rate of 35% to 21%, based on the newly enacted tax laws in December 2017. See below for more discussion related to newly enacted tax laws in December 2017.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (continued)

Deferred income tax assets and liabilities comprise the following (in thousands):

	December 31,	
	2018	2017
Deferred Tax Assets:		
Net operating loss carryforwards	\$ 56,828	\$ 44,912
Federal and state credits	28,328	26,170
Reserves, accruals and other	11,265	9,698
Fixed assets and intangibles	2,398	1,259
Total deferred tax assets	98,819	82,039
Valuation allowance	(92,891)	(76,101)
Total deferred tax assets, net of valuation allowance	5,928	5,938
Less deferred tax liabilities:		
Acquired intangibles	(313)	(2,054)
Property, plant and equipment	(4,754)	(3,338)
Net deferred tax assets	\$ 861	\$ 546
Reported as:		
Long term deferred tax assets, included within other long-term assets	\$ 861	\$ 652
Long term deferred income tax liabilities, included within noncurrent liabilities	—	(106)
Net deferred tax assets	\$ 861	\$ 546

The net valuation allowance increased by \$16.8 million in 2018 and decreased by \$14.0 million in 2017. The increase of valuation allowance in 2018 was due to increase in US deferred tax assets, while the decrease of valuation allowance in 2017 was due to remeasurement of US deferred tax assets based on a reduced tax rate of 21% from 35%. The Company did not record a full valuation allowance against its net deferred tax assets in most foreign jurisdictions as it believes these deferred tax assets were realizable on a more likely than not basis as of December 31, 2018. Based upon the weight of available evidence, which includes the Company's historical operating performance and the reported cumulative net losses to date, the Company continues to maintain a full valuation allowance against its net U.S. deferred tax assets.

The Company adopted ASU 2016-16 on a modified retrospective basis effective January 1, 2018. Upon adoption of this standard on January 1, 2018, the Company recorded \$1.8 million to accumulated deficit balance for intra-entity transfer of an asset other than inventory in prior years.

The Company adopted ASU 2016-9 effective January 1, 2017. Upon adoption, the Company's previously unrecognized excess tax benefits of \$8.6 million had no impact on its accumulated deficit balance as the related U.S. deferred tax assets were fully offset by a valuation allowance.

As of December 31, 2018, the Company had federal and state net operating loss, or NOL, carryforwards of \$276.6 million and \$52.0 million, respectively. Federal NOL carryforwards start to expire in 2022 and a portion of the California NOL carryforwards will begin to expire in 2028. As of December 31, 2018, the Company also had federal and state research and development tax credit carryovers of \$9.4 million and \$17.3 million, respectively. The federal credits will begin to expire in 2019 and the state credits can be carried forward indefinitely. The Company also had \$10.5 million of foreign tax credit carryforwards which will start to expire in 2022 if not utilized. Utilization of NOL carryforwards and carried over tax credits may be subject to substantial annual limitation due to federal and state ownership limitations. The annual limitation may result in the expiration of NOL and tax credit carryforwards before utilization. The deferred tax assets listed above do not include NOL carryforwards that are expected to expire unutilized as a result of existing ownership changes.

On December 22, 2017, the Tax Cuts and Jobs Act (the "TCJA") was enacted which, among other things, lowered the U.S. federal corporate income tax rate from 35% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously tax deferred and creates Global Intangible Low Taxed Income ("GILTI") to tax certain foreign sourced earnings. As of December 31, 2018, the Company has concluded the accounting under the TCJA within the time period set forth in Staff Accounting Bulletin 118. There was no provision impact of TCJA on the 2018 consolidated financial statements due to full valuation allowance on US deferred tax assets. In addition, the Company has elected to treat

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GILTI inclusion accounting impact as a current period expense. The Company continues the assertion to permanently reinvest its foreign earnings.

At December 31, 2018, the Company's gross unrecognized tax benefits were approximately \$26.2 million, of which \$0.1 million would impact the effective tax rate if recognized. Substantial portion of these unrecognized tax benefits could be subject to a valuation allowance if and when recognized in a future period, which could impact the timing of any related effective tax rate benefit. The Company does not believe that the amount of unrecognized tax benefits will change significantly in the next twelve months. There were no interest or penalties related to unrecognized tax benefits. The Company's policy is to classify interest and penalties associated with unrecognized tax benefits as income tax expense.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in thousands):

Balance at December 31, 2015	\$	20,686
Gross increases for tax positions of current year		2,920
Balance at December 31, 2016		23,606
Gross increases for tax positions of current year		1,933
Balance at December 31, 2017		25,539
Gross increases for tax positions of current year		657
Balance at December 31, 2018	\$	26,196

The Company's material tax jurisdictions are the United States federal, California, Japan and China. As a result of NOL carryforwards, substantially all of the Company's tax years remain open to U.S. federal and state tax examination. Tax years for 2012 and forward remain open for Chinese tax examination.

18. Segment and geographic information

The Company's Chief Executive Officer, who is considered to be the chief operating decision maker, manages the Company's operations as a whole and reviews financial information presented on a consolidated basis for purposes of evaluating financial performance and allocating resources. In 2018, 2017 and 2016, the Company operated in one reportable segment.

Through 2018, the Company has aligned its products to High Speed Products and Network Products and Solutions (see Note 3).

The following tables set forth the Company's asset information by geographic region (in thousands):

	As of December 31,	
	2018	2017
Property, plant and equipment, net:		
China	\$ 27,329	\$ 37,212
United States	29,054	42,243
Japan	29,631	43,826
Rest of world	14,076	4,284
Total	\$ 100,090	\$ 127,565

19. Selected Quarterly Financial Data (unaudited)

The following tables set forth a summary of the Company's quarterly financial information for each of the four quarters for the years ended December 31, 2018 and 2017:

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Year ended December 31, 2018	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	<i>(In thousands, except per share data)</i>			
Revenues	\$ 68,586	\$ 81,102	\$ 81,748	\$ 91,104
Gross profit	9,182	15,472	18,933	22,586
Net loss	(18,246)	(10,537)	(8,125)	(6,729)
Basic net loss per share	\$ (0.41)	\$ (0.24)	\$ (0.18)	\$ (0.15)
Diluted net loss per share	\$ (0.41)	\$ (0.24)	\$ (0.18)	\$ (0.15)
Weighted averages shares used to compute basic net loss per share	44,259	44,665	45,476	46,150
Weighted averages shares used to compute diluted net loss per share	44,259	44,665	45,476	46,150

Year ended December 31, 2017	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	<i>(In thousands, except per share data)</i>			
Revenues	\$ 71,688	\$ 73,214	\$ 71,121	\$ 76,871
Gross profit	18,503	16,777	10,513	15,686
Net loss	(11,522)	(9,341)	(18,187)	(14,283)
Basic net loss per share	\$ (0.27)	\$ (0.22)	\$ (0.42)	\$ (0.32)
Diluted net loss per share	(0.27)	(0.22)	(0.42)	(0.32)
Weighted averages shares used to compute basic net loss per share	42,615	43,219	43,790	44,079
Weighted averages shares used to compute diluted net loss per share	42,615	43,219	43,790	44,079

20. Subsequent Events

Subsequent events included the following:

In January 2019, the Company repaid \$5.0 million to Wells Fargo under the Credit Facility.

In January 2019, the Company and Lestina signed a settlement agreement under which the Company agreed to pay Lestina \$2.2 million in cash (see Note 14).

In January 2019, the Company announced the end-of-life of certain client transceiver modules and therefore will discontinue the manufacture and sale of those products after completing final production in May 2019. This will result in accelerated depreciation of approximately \$3.0 million, to be amortized over the final production during the first and second quarters of 2019.

In the first quarter of 2019, APAT OE filed a lawsuit in the Intermediate Court of Shenzhen against Neo China, NeoPhotonics Corporation Limited (HK), Novel Centennial Limited (BVI) and NeoPhotonics Corporation, asserting claims and damages against all parties (see Note 14).

In February 2019, NeoChina filed a claim against APAT OE in the Shenzhen Court of International Arbitration (see Note 14).

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of December 31, 2017. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (Exchange Act), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Based upon that evaluation as of the end of the period covered in this Annual Report on Form 10-K, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective as of December 31, 2018 at a reasonable assurance level.

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) as defined in the Exchange Act. Internal control over financial reporting consists of policies and procedures that: (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our company assets; (2) are designed and operated to provide reasonable assurance regarding the reliability of our financial reporting and our process for the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and that receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control – Integrated Framework (2013)*. Based on the results of our assessment, using the criteria in *Internal Control – Integrated Framework (2013)*, our management has concluded that we maintained effective internal control over financial reporting as of December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which appears below.

Changes in Internal Control Over Financial Reporting

There have not been any changes in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) in the fourth quarter of 2018 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitation on the Effectiveness of Internal Controls

The effectiveness of any system of internal control over financial reporting is subject to inherent limitations, including the exercise of judgment in designing, implementing, operating, and evaluating the controls and procedures, and the inability to eliminate misconduct completely. Accordingly, any system of internal control over financial reporting can only provide reasonable, not absolute, assurance. In addition, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. We intend to continue to monitor and upgrade our internal controls as necessary or

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appropriate for our business, but cannot assure that such improvements will be sufficient to provide us with effective internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of NeoPhotonics Corporation

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of NeoPhotonics Corporation and subsidiaries (the “Company”) as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB) and in accordance with auditing standards generally accepted in the United States of America, the consolidated financial statements as of and for the year ended December 31, 2018, of the Company and our report dated March 7, 2019, expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying *Management’s Report on Internal Control Over Financial Reporting*. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ DELOITTE & TOUCHE LLP

San Jose, California
March 7, 2019

ITEM 9B. OTHER INFORMATION

Not applicable.

Part III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required regarding our directors is incorporated herein by reference from the information contained in the section entitled “Proposal 1—Election of Directors” in our definitive Proxy Statement for the 2019 Annual Meeting of Stockholders (our “Proxy Statement”), a copy of which will be filed with the SEC on or before April 30, 2019.

The information required regarding our executive officers is incorporated herein by reference from the information contained in the section entitled “Management” in our Proxy Statement.

The information required regarding Section 16(a) beneficial ownership reporting compliance is incorporated by reference from the information contained in the section entitled “Section 16(a) Beneficial Ownership Reporting Compliance” in our Proxy Statement.

The information required with respect to procedures by which security holders may recommend nominees to our board of directors, the composition of our Audit Committee, and whether the Company has an “audit committee financial expert”, is incorporated by reference from the information contained in the section entitled “Proposal 1—Election of Directors” in our Proxy Statement.

Adoption of Code of Ethics

We have adopted a Code of Business Conduct and Ethics (the “Code”) applicable to all of our board of director members, employees and executive officers, including our Chief Executive Officer (Principal Executive Officer), and Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer). We have made the Code available on our website at <http://www.neophotonics.com>.

We intend to satisfy the public disclosure requirements regarding (1) any amendments to the Code, or (2) any waivers under the Code given to our Principal Executive Officer, Principal Financial Officer and Principal Accounting Officer by posting such information on our website at <http://www.neophotonics.com>. There were no amendments to the Code or waivers granted thereunder relating to the Principal Executive Officer, Principal Financial Officer or Principal Accounting Officer during 2018.

ITEM 11. EXECUTIVE COMPENSATION

The information required regarding the compensation of our directors and executive officers is incorporated herein by reference from the information contained in the sections entitled “Executive Compensation,” “Director Compensation,” “Compensation Committee Report” and “Compensation Committee Interlocks and Insider Participation” in our Proxy Statement.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The information required regarding security ownership of our 5% or greater stockholders and of our directors and management is incorporated herein by reference from the information contained in the section entitled “Security Ownership of Certain Beneficial Owners and Management” in our Proxy Statement.

The information required regarding securities authorized for issuance our equity compensation plans is incorporated herein by reference from the information contained in the section entitled “Equity Compensation Plan Information” in our Proxy Statement.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required regarding related transactions is incorporated herein by reference from the information contained in the section entitled “Certain Relationships and Related Transactions” and, with respect to director independence, the section entitled “Proposal 1—Election of Directors” in our Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required is incorporated herein by reference from the information contained in the sections entitled “Principal Accountant Fees and Services” and “Pre-Approval Policies and Procedures” in the section entitled “Proposal 2—Ratification of Appointment of Independent Registered Public Accounting Firm” in our Proxy Statement.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

We have filed the following documents as part of this Form 10-K:

1. Consolidated Financial Statements:

	<u>Page No.</u>
Report of Independent Registered Public Accounting Firm	54
Consolidated Balance Sheets	55
Consolidated Statements of Operations	56
Consolidated Statements of Comprehensive Loss	57
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2. Financial Statement Schedules

All schedules have been omitted because they are not required, not applicable, not present in amounts sufficient to require submission of the schedule, or the required information is otherwise included.

3. Exhibits

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Exhibit no.	Description of exhibit	Form	SEC File No.	Exhibit	Filing Date	Filed Herewith
2.1*	Asset Purchase Agreement dated December 14, 2016, by and among NeoPhotonics Dongguan Co., Ltd., NeoPhotonics (China) Co., Ltd. and APAT Optoelectronics Components Co., Ltd.	Form 8-K	001-35061	2.1	January 23, 2017	
2.2*	Supplementary Agreement to Asset Purchase Agreement, dated January 12, 2017, between APAT Optoelectronics Components Co., Ltd., NeoPhotonics Dongguan Co., Ltd. and NeoPhotonics (China) Co., Ltd.	Form 8-K	001-35061	2.2	January 23, 2017	
2.3*	Second Supplementary Agreement to Asset Purchase Agreement, dated January 14, 2017, between APAT Optoelectronics Components Co., Ltd., NeoPhotonics Dongguan Co., Ltd. and NeoPhotonics (China) Co., Ltd.	Form 8-K	001-35061	2.3	January 23, 2017	
3.1	Amended and Restated Certificate of Incorporation of NeoPhotonics Corporation.	Form 8-K	001-35061	3.1	February 10, 2011	
3.2	Amended and Restated Bylaws of NeoPhotonics Corporation.	Form S-1	333-166096	3.4	November 22, 2010	
4.1	Specimen Common Stock Certificate of NeoPhotonics Corporation.	Form S-1/A	333-166096	4.1	May 17, 2010	
4.2	2008 Investors' Rights Agreement by and between NeoPhotonics Corporation and the investors listed on Exhibit A thereto, dated May 14, 2008.	Form S-1	333-166096	4.2	April 15, 2010	
10.1	Form of Indemnification Agreement entered into by and between NeoPhotonics Corporation and each of its directors and officers.	Form S-1	333-166096	10.1	April 15, 2010	
10.2+	2004 Stock Option Plan, as amended, and related documents.	Form S-1	333-166096	10.2	April 15, 2010	
10.3+	2007 Stock Appreciation Grants Plan and related documents.	Form S-1	333-166096	10.3	April 15, 2010	
10.4+	2010 Equity Incentive Plan, as amended and forms of agreement thereunder.	Form S-8	333-189577	99.1	June 25, 2013	
10.5+	Amended and Restated Non-Employee Director Compensation Policy of NeoPhotonics Corporation.	Form 10-K	001-35061	10.5	March 16, 2017	
10.6+	2010 Employee Stock Purchase Plan.	Form S-1	333-166096	10.5	April 15, 2010	
10.7	Lease between Santur Corporation and 40915 Encyclopedia Circle, LLC, dated June 28, 2010.	Form 10-K	001-35061	10.35	March 30, 2012	
10.8	First Lease Amendment by and between NeoPhotonics Corporation and Landlord as defined in the recitals thereto, dated May 21, 2013.	Form 10-Q	001-35061	10.3	August 8, 2013	
10.9*	Maximum Comprehensive Credit Line Contract and Maximum Mortgage Contract by and between Agricultural Bank of China and NeoPhotonics (China) Co., Ltd. dated November 3, 2008 and December 25, 2008, respectively.	Form S-1	333-166096	10.9	April 15, 2010	
10.10	Property Lease Contract between NeoPhotonics (China) Co., Ltd. and Dongguan Conrad Hi-Tech Park Ltd., dated May 13, 2011.	Form 10-Q	001-35061	10.3	November 10, 2011	
10.11	Building Lease Agreement between NeoPhotonics Japan Godo Kaisha and Jones Lang Lasalle K.K., dated September 8, 2011.	Form 10-Q	001-35061	10.4	November 10, 2011	
10.12+	Employment Letter by and between NeoPhotonics Corporation and Timothy S. Jenks, dated March 30, 2010.	Form S-1	333-166096	10.17	April 15, 2010	
10.13+	Offer Letter by and between NeoPhotonics Corporation and Dr. Wupen Yuen, dated January 2, 2005.	Form S-1	333-166096	10.19	April 15, 2010	
10.14*+	Offer Letter by and between NeoPhotonics (China) Co., Ltd. and Chi Yue ("Raymond") Cheung, dated August 14, 2007.	Form S-1	333-166096	10.20	April 15, 2010	
10.15+	2011 Inducement Award Plan and related documents.	Form S-8	333-177306	99.1	October 13, 2011	

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Exhibit no.	Description of exhibit	Form	SEC File No.	Exhibit	Filing Date	Filed Herewith
10.16	Share Purchase Agreement, dated April 27, 2012 by and between the Company and Open Joint Stock Company "RUSNANO."	Form 8-K	001-35061	10.1	May 1, 2012	
10.17	Rights Agreement, dated April 27, 2012 by and between the Company and Open Joint Stock Company "RUSNANO."	Form 8-K	001-35061	10.2	May 1, 2012	
10.18+	Amended and Restated Severance Agreement by and between NeoPhotonics Corporation and Benjamin L. Sitler dated October 8, 2014.	Form 10-Q	001-35061	10.1	November 10, 2014	
10.19**	Loan Agreement by and between NeoPhotonics Semiconductor GK and The Bank of Tokyo-Mitsubishi UFJ, Ltd., dated February 25, 2015 (Contract A).	Form 10-K	001-35061	10.42	March 16, 2015	
10.20**	Loan Agreement by and between NeoPhotonics Semiconductor GK and The Bank of Tokyo-Mitsubishi UFJ, Ltd., dated February 25, 2015 (Contract B).	Form 10-K	001-35061	10.43	March 16, 2015	
10.21	Letter Agreement by and between NeoPhotonics Corporation and Open Joint Stock Company "RUSNANO," dated March 2, 2015.	Form 10-K	001-35061	10.44	March 16, 2015	
10.22	Amendment to Rights Agreement, dated as of July 13, 2015, by and between NeoPhotonics Corporation and Open Joint Stock Company "RUSNANO."	Form 8-K	001-35061	10.1	July 15, 2015	
10.23*	Amendment to Credit Agreement and Amendment to Security Agreement, dated October 20, 2015, by and between NeoPhotonics Corporation and CITIC Bank.	Form 10-Q	001-35061	10.2	November 6, 2015	
10.24*	Comprehensive Credit Granting Contract, dated October 20, 2015, by and between Neophotonics (China) Co., Ltd., Neophotonics Dongguan Co., Ltd. and Shenzhen Branch CITIC Bank.	Form 10-K	001-35061	10.42	March 15, 2016	
10.25*	Credit Line Agreement, dated July 9, 2015, by and between NeoPhotonics (China) Co., Ltd and Shanghai Pudong Development Bank Corporation.	Form 10-K	001-35061	10.43	March 15, 2016	
10.26+	Retention Agreement by and between the Company and Timothy S. Jenks, dated August 5, 2016.	Form 10-Q	001-35061	10.2	August 9, 2016	
10.27+	Retention Agreement by and between the Company and Dr. Chi Yue ("Raymond") Cheung, dated August 5, 2016.	Form 10-Q	001-35061	10.3	August 9, 2016	
10.28+	Retention Agreement by and between the Company and Benjamin L. Sitler, dated August 5, 2016.	Form 10-Q	001-35061	10.5	August 9, 2016	
10.29+	Retention Agreement by and between the Company and Dr. Wupen Yuen, dated August 5, 2016.	Form 10-Q	001-35061	10.6	August 9, 2016	
10.30	Lease Agreement, dated September 9, 2016, by and between NeoPhotonics Corporation and SP Zanker Property LLC.	Form 10-Q	001-35061	10.7	November 8, 2016	
10.31*	Extension dated September 14, 2016 of Property Lease Contract, dated May 31, 2011, by and between NeoPhotonics Dongguan Co., Ltd. and Dongguan Conrad Hi-Tech Park, Ltd.	Form 10-Q	001-35061	10.8	November 8, 2016	
10.32*	Amendment dated August 3, 2016, by and between NeoPhotonics (China) Co., Ltd. and Shanghai Pudong Development Bank Shenzhen Branch, to that certain Credit Line Agreement dated as of July 9, 2015	Form 10-Q	001-35061	10.11	November 8, 2016	
10.33	Second Amendment dated August 2, 2016 to that certain Rights Agreement dated as of April 27, 2012 between the Company and Open Joint Stock Company "RUSNANO"	Form 10-Q	001-35061	10.12	November 8, 2016	

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Exhibit no.	Description of exhibit	Form	SEC File No.	Exhibit	Filing Date	Filed Herewith
10.34*	Comprehensive Credit Granting Contract, dated October 21, 2016, by and between Neophotonics (China) Co., Ltd. and Shenzhen Branch CITIC Bank	Form 10-Q	001-35061	10.13	November 8, 2016	
10.35*	Financing Line of Credit Agreement, dated July 25, 2016, by and between Neophotonics Dongguan Co., Ltd. and Shanghai Pudong Development Bank Shenzhen Branch	Form 10-Q	001-35061	10.14	November 8, 2016	
10.36**	Term Loan Agreement, dated March 29, 2017, by and between NeoPhotonics Semiconductor GK and The Bank of Tokyo-Mitsubishi.	Form 10-Q	001-35061	10.2	May 9, 2017	
10.37	Lease Agreement, dated June 13, 2017, by and between NeoPhotonics Corporation and The Realty Associates Fund X, L.P.	Form 8-K	001-35061	10.1	June 19, 2017	
10.38+	Offer Letter dated July 13, 2017 by and between NeoPhotonics Corporation and Elizabeth Eby.	Form 10-Q	001-35061	10.1	November 8, 2017	
10.39+	Retention Agreement dated August 14, 2017 by and between NeoPhotonics Corporation and Elizabeth Eby.	Form 10-Q	001-35061	10.2	November 8, 2017	
10.40	Credit Agreement, dated as of September 8, 2017, among NeoPhotonics Corporation, the lenders from time to time party thereto and Wells Fargo Bank, National Association, as administrative agent.	Form 8-K	001-35061	10.1	September 11, 2017	
10.41*	Comprehensive Credit Granting Contract, dated December 14, 2017, by and between NeoPhotonics (China) Co., Ltd. and China CITIC Bank.	Form 8-K	001-35061	10.1	December 18, 2017	
10.42**	Loan Agreement by and between NeoPhotonics Semiconductor GK and The Bank of Toyko-Mitsubishi UFJ, Ltd. and The Yamanashi Chou Bank, Ltd. dated January 29, 2018	Form 10-K	001-35061	10.73	March 9, 2018	
10.43+	Amendment to Retention Agreement by and between NeoPhotonics Corporation and Elizabeth Eby dated November 6, 2017.	Form 10-K	001-35061	10.74	March 9, 2018	
10.44+	Offer Letter dated March 19, 2018 by and between NeoPhotonics Corporation and Yang Chiah Yee.	Form 10-Q	001-35061	10.2	May 9, 2018	
10.45+	Retention Agreement dated March 22, 2018 by and between NeoPhotonics Corporation and Yang Chiah Yee.	Form 10-Q	001-35061	10.3	May 9, 2018	
10.46+	2018 Bonus Program	Form 10-Q	001-35061	10.1	August 6, 2018	
10.47	Framework Purchase Agreement dated December 14, 2018 by and between NeoPhotonics Corporation and Joint Stock Company "RUSNANO."					X
21.1	List of subsidiaries of NeoPhotonics Corporation.					X
23.1	Consent of Deloitte & Touche LLP, independent registered public accounting firm.					X
24.1	Power of Attorney (incorporated by reference to the signature page of this Annual Report on Form 10-K).					X
31.1	Certification pursuant to Rule 13a-14(a)/15d-14(a).					X
31.2	Certification pursuant to Rule 13a-14(a)/15d-14(a).					X
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350 as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
Exhibit no.	Description of exhibit	Form	SEC File No.	Exhibit	Filing Date	Filed Herewith
101.INS	XBRL Instance Document.					
101.SCH	XBRL Taxonomy Extension Schema Document.					
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.					
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.					
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.					
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.					

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*Translation to English of an original Chinese document.

**Translation to English of an original Japanese document.

+Management compensatory plan or arrangement.

ITEM 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

NeoPhotonics Corporation

By: _____ /s/ TIMOTHY S. JENKS

Timothy S. Jenks
President, Chief Executive Officer and
Chairman of the Board of Directors

March 7, 2019

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Timothy S. Jenks and Elizabeth Eby, and each of them, jointly and severally, his/her attorneys-in-fact, each with the power of substitution, for him/her in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his/her substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons on March 7, 2019 on behalf of the Registrant and in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ TIMOTHY S. JENKS</u> Timothy S. Jenks	President, Chief Executive Officer and Chairman of the Board of Directors (Principal Executive Officer)	March 7, 2019
<u>/s/ ELIZABETH EBY</u> Elizabeth Eby	Senior Vice President, Finance and Chief Financial Officer (Principal Financial and Accounting Officer)	March 7, 2019
<u>/s/ CHARLES J. ABBE</u> Charles J. Abbe	Director	March 7, 2019
<u>_____</u> Dmitry Akhanov	Director	
<u>/s/ BANDEL L. CARANO</u> Bandel L. Carano	Director	March 7, 2019
<u>/s/ RAJIV RAMASWAMI</u> Rajiv Ramaswami	Director	March 7, 2019
<u>/s/ MICHAEL J. SOPHIE</u> Michael J. Sophie	Director	March 7, 2019
<u>/s/ IHAB S. TARAZI</u> Ihab S. Tarazi	Director	March 7, 2019

JOINT STOCK COMPANY "RUSNANO"

and

LIMITED LIABILITY COMPANY "RNI"

as the Purchasers

and

NEOPHOTONICS CORPORATION

as the Seller

FRAMEWORK PURCHASE AGREEMENT

DATED 14 December 2018

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Schedule 13	Seller's Warranties
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THIS FRAMEWORK PURCHASE AGREEMENT (this "**Agreement**") is entered into on 14 December 2018 by and between:

- (1) **JOINT STOCK COMPANY "RUSNANO"**, a company incorporated under the laws of the Russian Federation, main state registration number (OGRN) 1117799004333, whose registered office is at: office 708.1, 10A Prospect 60-letiya Oktyabrya, Moscow, 117036, Russian Federation ("**Purchaser 1**");
- (2) **LIMITED LIABILITY COMPANY "RNI"**, a company incorporated under the laws of the Russian Federation, main state registration number (OGRN) 5147746226304, whose registered office is at: office 511, 10A Prospect 60-letiya Oktyabrya, Moscow, 117036, Russian Federation ("**Purchaser 2**" and together with Purchaser 1 the "**Purchasers**") and
- (3) **NEOPHOTONICS CORPORATION**, a company incorporated under the laws of Delaware, the United States of America, registration number 2670850, located at 2911 Zanker Road, San Jose, CA 95134, United States of America (the "**Seller**")

(each a "**Party**" and collectively the "**Parties**").

WHEREAS:

- (A) The Seller is the legal and beneficial owner of the Participatory Interest comprising the whole of the issued share capital of the Company.
- (B) The Seller wishes to sell and the Purchasers wish to purchase the Participatory Interest on the terms and conditions set out herein.

NOW IT IS HEREBY AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Agreement, including the recitals, the following words will have the following meanings unless the context otherwise requires:

"AAWG (100 GHz)" means Athermal Arrayed Waveguide Grating (Finished Goods Product Number (PN) 1000042377 (WIDEBAND, 40CH, 100GHZ, DMUX, 1530.33, LC/UPC).

"Affiliate" or "Affiliated" means in relation to a person (a) a person directly or indirectly Controlled by, or under common Control with that person; or (b) a person owning or controlling fifty (50) per cent or more of the issued voting securities or beneficial interests of the first person; or (c) a director, partner or member of the immediate family of a director or partner, of the first person and in the case of a trust, any trustee or beneficiary (actual or potential) of that trust.

"Agreement" means this Agreement (together with all its recitals and schedules), as amended from time to time.

"Agreement and Acknowledgement Regarding Penalty Payment" means the agreement to be entered into between the Seller and Purchaser 1 substantially in the form and substance set out in Schedule 1.

"Applicable Law" means all applicable provisions of all (a) constitutions, treaties, statutes, laws (including the common law), codes, rules, regulations, ordinances or orders of any Governmental Authority, (b) governmental approvals and (c) orders, decisions, injunctions, judgments, awards and decrees of or agreements with any Governmental Authority.

"Budget" means the operating budget of the Company for the period through the Review Date as set out in Schedule 2 hereto.

"Business Day" means a day (other than a Saturday and a Sunday) on which banks generally are open for business in the Russian Federation or the United States.

"Capital Stock" means (a) in the case of a corporation, its shares of capital stock, (b) in the case of a partnership or limited liability company, its partnership or membership interests or units (whether general or limited), and (c) any other interest that confers on a person the right to receive a share of the profits and losses, or distribution of assets, of the issuing entity.

"Cash Shortage" has the meaning set out in Clause 5.7(a).

"CFP2 – LR4" means a 100G form factor pluggable transceiver module which is either (a) Finished Goods Product Number (PN) 1000042366 (PT-C24C3LECL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP SINGLE-RATE G2) or (b) Finished Goods Product Number (PN) 1000042365 (PT-C24C3LDCL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP DUAL-RATE G2).

"Commitment" means (a) options, warrants, convertible securities, exchangeable securities, subscription rights, conversion rights, exchange rights, or other Contracts that could require a person to issue any of its Equity Securities or to sell any Equity Securities it owns in another person; (b) any other securities convertible into, exchangeable or exercisable for, or representing the right to subscribe for any Equity Securities of a person or owned by a person; and (c) profit participation, or other similar rights with respect to a person.

"Company" means limited liability company NeoPhotonics Corporation, LLC, incorporated under the laws of the Russian Federation under the basic state registration No. 1127746681710, registered address at Volgogradsky Prospekt 42, building 5, Moscow 109316, Russia.

"Completion" has the meaning set out in Clause 3.

"Completion Date" has the meaning set out in Clause 3.

"Components Supply Agreement" means an agreement to be entered into between the Company and NeoPhotonics China or NeoPhotonics Dongguan substantially in the form and substance set out in Schedule 3.

"Consent" means any consent, approval, notification, waiver, or other similar action (including by a Governmental Authority) that is necessary under Applicable Law.

"Constitutive Documents" means in respect of a person (other than a natural person) the permit for its establishment (if applicable), its articles and memorandum of association (if applicable), its charter, its foundation agreement (if applicable), its by-laws, its certificate of registration and its other organisational documents.

"Contract" means any contract, agreement (including leases), deed, arrangement, commitment, letter of intent, memorandum of understanding, heads of agreement, promise, obligation, right, instrument, document, or other similar understanding, whether written or oral, including any sales order or purchase order.

"Control" means, in relation to a company or other entity: (i) the legal power to secure directly or indirectly that the affairs of such entity are conducted in accordance with his or its wishes, including to direct or cause the direction of its general management and policies; (ii) the ability to appoint, directly or indirectly, the majority of its directors or executive officers; (iii) the ability to exercise, directly or indirectly, a majority of the votes exercisable at a general meeting; or (iv) the right to receive, directly or indirectly, a majority of the proceeds arising from: (a) any declaration of a dividend; or (b) a distribution arising in the course of winding up, whether solvent or insolvent, or any return of capital to shareholders or members; and the expressions Controlled and Controlling shall be construed accordingly.

"Counterparty" has the meaning set out in Clause 5.9(b).

"EGRUL" means the unified state register of legal entities maintained pursuant to Russian Federation federal law No. 129-FZ dated 8 August 2001 (as amended from time to time).

"Encumbrance" means a mortgage, charge, pledge, lien, option, restriction, right of first refusal, right of pre-emption, assignment by way of security, third party right or interest, other encumbrance or security interest or derivative interest of any kind whatsoever, created or arising under any Applicable Law or any other type of preferential arrangement (including a title transfer or retention arrangement) having similar effect (and, where used in respect of any Equity Security, voting trust and any voting agreements or arrangements).

"Equipment Contribution" has the meaning set out in Clause 2.5(a).

"Equity Securities" means the issued (a) shares of Capital Stock, and (b) options, warrants, purchase rights, subscription rights, conversion rights, exchange rights or other contracts that, directly or indirectly, could require the issuer thereof to issue, sell or otherwise cause to become outstanding shares of Capital Stock.

"Escrow Account" means an account to be opened at the Escrow Agent pursuant to the Escrow Agreement for the purpose of depositing therein the Purchase Price – Cash Portion and disbursing the funds therein as set out in this Agreement.

"Escrow Agent" means a bank to be selected by the Seller and Purchaser 1 for the purpose of opening, maintaining and operating the Escrow Account.

"Escrow Agreement" means an agreement substantially in the standard form used by the Escrow Agent, to be entered into by the Escrow Agent, the Seller and Purchaser 1 on the terms satisfactory to the parties thereto, for the purpose of governing the opening, maintenance, operation and closing of the Escrow Account.

"FAS Consent" means the Consent of the Federal Antimonopoly Service of the Russian Federation to the purchase by Purchaser 1 of Participatory Interest 1.

"Governmental Authority" means any parliament, government, ministry, committee, inspectorate, authority, agency, commission, official or other competent authority of the Russian Federation, or any other country or any state, as well as any county, city or other administrative subdivision of any of the foregoing.

"Intellectual Property Contribution" has the meaning set out in Clause 2.5(b).

"Liability Limit" has the meaning set out in Clause 2.6(a).

"LLC Law" means Federal Law of the Russian Federation No. 14-FZ "On Limited Liability Companies" dated February 8, 1998 (as amended).

"Long Stop Date" means 31 January 2019.

"Manufacturing License Agreement" means an agreement to be entered into between the Seller and the Company substantially in the form and substance set out in [Schedule 4](#).

"Material Adverse Effect" means any event, change or effect in the condition (financial or otherwise), properties, assets, liabilities, rights, obligations, operations, business, or prospects, which event, fact, circumstance or condition or change (or effect), individually or in the aggregate (together with all other changes, events, facts and conditions that have occurred prior to the date of determination), could reasonably be expected to be materially adverse to:

- (a) rights of either Party under this Agreement or any other Transaction Document;
- (b) the business, results of operations, workforce, prospects, financial position, properties, assets, liabilities or condition (financial or otherwise) of the Company;
- (c) ability of any Party to perform the transactions contemplated hereby or to perform and comply with their respective obligations hereunder; or
- (d) the validity, legality or enforceability of this Agreement and/or any other Transaction Document.

"NeoPhotonics China" means NeoPhotonics (China) Co., Ltd. (PRC).

"NeoPhotonics Dongguan" means NeoPhotonics Dongguan Co., Ltd. (PRC).

"Notarized SPA" means a Russian law-governed participatory interest sale agreement in the agreed form set out in [Schedule 5](#).

"Notifying Counterparty" has the meaning set out in Clause 5.9(b).

"Order" means any order, ruling, decision, verdict, decree, writ, subpoena, mandate, precept, command, directive, consent, approval, award, judgment, injunction, or other similar determination or finding by, before, or under the supervision of any Governmental Authority, arbitrator, or mediator.

"Outstanding Indebtedness to Company" means, as of the Signing Date, the indebtedness of the Seller to the Company in the amount of one hundred fifty thousand six hundred ninety five US Dollars and four cents (USD 150,695.04) in respect of goods furnished by the Company to the Seller.

"Participatory Interest" means a participatory interest representing one hundred percent (100%) of the charter capital of the Company with a nominal value of RUB 9,814,867 owned by the Seller, as more particularly described in [Schedule 6](#).

"Participatory Interest 1" means a participatory interest representing ninety nine percent (99%) of the charter capital of the Company with a nominal value of RUB 9,716,718.33.

"Participatory Interest 2" means a participatory interest representing one percent (1%) of the charter capital of the Company with a nominal value of RUB 98,148.67.

"Parties" has the meaning set out in the preamble to this Agreement.

"Production Purchase" has the meaning set out in Clause 5.5(a).

"Purchase Order" means the standard purchase order of NeoPhotonics China or NeoPhotonics Dongguan in the respective forms set out in [Schedule 7](#).

"Purchase Price – Cash Portion" means the amount of two million US Dollars (USD 2,000,000).

"Purchase Price – Penalty Offset Portion" means the amount of one million US Dollars (USD 1,000,000) which shall be paid by Purchaser 1 by performing the offset as set out in more detail in the Agreement and Acknowledgement Regarding Penalty Payment.

"Purchase Price - Total" means three million US Dollars (USD 3,000,000), comprised of Purchase Price – Cash Portion and Purchase Price – Penalty Offset Portion (of which two million nine hundred seventy thousand US Dollars (USD 2,970,000) shall be attributable to Participatory Interest 1 and thirty thousand US Dollars (USD 30,000) shall be attributable to Participatory Interest 2).

"Purchaser 1" has the meaning set out in the preamble to this Agreement.

"Purchaser 2" has the meaning set out in the preamble to this Agreement.

"**Purchasers**" has the meaning set out in the preamble to this Agreement.

"**Refund Amount**" means two hundred fifty thousand US Dollars (USD 250,000).

"**Register**" means the register of members held by the Company.

"**Responding Counterparty**" has the meaning set out in Clause 5.9(b).

"**Review Date**" means 31 March 2019.

"**Seller**" has the meaning set out in the preamble to this Agreement.

"**Seller's Warranties**" has the meaning set out in Clause 4.2.

"**Signing Date**" means the date of this Agreement.

"**Subsidiary**" means, with respect to any person: (a) any company of which more than fifty (50) percent of the total voting power of all classes of the Equity Securities entitled (without regard to the occurrence of any contingency) to vote in the election of directors is owned by such person directly or through one or more other Subsidiaries of such person and (b) any person other than a corporation of which at least a majority of the Equity Securities (however designated) entitled (without regard to the occurrence of any contingency) to vote in the election of the governing body, partners, managers or others that will control the management of such entity is owned by such person directly or through one or more other Subsidiaries of such person.

"**Surviving Provisions**" means Clause 1 and Clauses 6 through 11.

"**Target Date**" has the meaning set out in Clause 5.7(a).

"**Tax**" or "**Taxation**" means all federal, statutory, governmental, state, local governmental, provincial, community, municipal or regional taxes, levies, imposts, duties, customs duties, charges, fees, tariffs, deductions, withholdings and contributions and their derivatives (including in all cases advance payments of same), whether direct or indirect and whether levied by reference to income, salaries, or other payments to the employees, profits, gains, excess profits, net wealth, asset value, turnover, added value, real estate or other reference, and mandatory payments to social funds and pension funds, in all cases of any kind arising in the Russian Federation or any part of the world together with all penalties, charges, costs, fines, surcharges and interest relating thereto.

"**Tech Transfer**" means the completion of all of the following items:

- (i) the Manufacturing License Agreement has been entered into by both parties thereto and is in full force and effect;
- (ii) the documentation of the production process for CFP2– LR4 and AAWG (100 GHz), listed in Schedule 8, has been provided to the Company. To confirm the delivery of the respective documentation, the Company and the Seller should execute a corresponding act of acceptance;
- (iii) Company personnel has been trained on the production process for CFP2– LR4 and AAWG (100 GHz). To confirm the training, the Seller shall cause the Company to produce a training accomplishment summary showing names of personnel training, duration of training, technologies subject to training and relevant manufacturing processes trained;
- (iv) the Equipment Contribution per Schedule 11 has been delivered to the Company and is reflected in the books of the Company;
- (v) the respective equipment constituting the Equipment Contribution has become duly owned by the Company, has been properly installed, is fully operative and functional and capable of producing AAWGs (100GHz) and CFP2-LR4s, as confirmed by the Company and the Purchasers following respective testing at the premises of the Company. To confirm that the equipment is fully operational and functional, the Company shall provide to the Seller and Purchaser 1 a corresponding report;
- (vi) 10 or more pilot units of CFP2– LR4 and 10 or more pilot units of AAWG (100 GHz) have been produced (for the avoidance of doubt, at the premises of the Company and by its own employees) to demonstrate operation of equipment per subclause (v) above, and these units meet the Seller's production specification;

- (vii) Units of CFP2-LR4 and of AAWG (100 GHz) have demonstrated target yield as statistically set forth in Schedule 9 as the "Target Yield". For the Tech Transfer the yield shall be statistically defined per Schedule 9. For CFP2-LR4 the LCL is 72 and for AAWG the LCL is 82;
- (viii) The Company will provide a corresponding report that shall contain number of CFP2-LR4 and AAWG (100 GHz) manufactured, production specification test results and resulting yield; and
- (ix) Purchase Orders for 50 units of CFP2-LR4 and 100 units of AAWG (100 GHz) have been placed with the Company by NeoPhotonics China or NeoPhotonics Dongguan, as detailed in Clause 5.5, and remain in full force and effect.

"**Technical Services Agreement**" means an agreement to be entered into between the Company and the Seller substantially in the form and substance set out in Schedule 10.

"**Termination Date**" means the date on which this Agreement is terminated pursuant to Clause 8.2.

"**Transactions**" means (a) the sale of the Participatory Interest by the Seller to the Purchasers and Purchaser 1's delivery of the Purchase Price - Total therefor; (b) the execution, delivery, and performance of all of the documents, instruments and agreements to be executed, delivered, and performed in connection herewith; and (c) the performance by the Parties of their respective covenants and obligations under this Agreement.

"**Transaction Documents**" means

- (a) this Agreement;
- (b) the Escrow Agreement;
- (c) the Notarized SPA;
- (d) the Technical Services Agreement;
- (e) the Manufacturing License Agreement;
- (f) the Components Supply Agreement;
- (g) the Agreement and Acknowledgement Regarding Penalty Payment; and
- (h) any other document or agreement so designated by the Parties in writing.

"**VAT**" means the Russian Federation value added tax.

1.2 Interpretation

Unless otherwise provided, in this Agreement:

- (a) references to "person" mean any natural person, firm, company, corporation, society, trust, foundation, government, state or agency of a state or any other entity or any association or partnership (whether or not having separate legal personality) of two or more of such entities;
- (b) references to "recitals" or "Clauses" or "Schedules" mean recitals in or Clauses of or Schedules to this Agreement, unless otherwise indicated;
- (c) references to "USD" or "US Dollars" mean the lawful currency of the United States of America;
- (d) references to "RUB" or "Rubles" mean the lawful currency of the Russian Federation;
- (e) references to "writing" or "written" includes faxes but not email;
- (f) the Clause and Schedule headings contained in this Agreement are inserted for convenience only and do not affect in any way the meaning or interpretation of this Agreement;
- (g) a reference to "assets" is a reference to real property, machinery, stock, and other tangible or intangible assets;
- (h) a reference to "liability" includes any actual or contingent liability;

- (i) a reference to "shares" includes, where relevant, participatory interests or quotas;
- (j) words in a singular form at the same time include the plural and vice versa and words of one gender include the words of any other gender;
- (k) the rule known as the *ejusdem generis* rule shall not apply and accordingly general words introduced by the word "other" shall not be given a restrictive meaning by reason of the fact that they are preceded by words indicating a particular class of acts, matters or things;
- (l) any phrase introduced by the words "include", "including" or "in particular" or any similar words or expression shall be construed as illustrative and shall not be given a restrictive meaning by reason of the fact that they are followed by particular examples intended to be embraced by the general words;
- (m) references to any US or Delaware law legal term (including terms for any action, remedy, method or judicial proceeding, legal document, legal status, court, official or any legal concept or thing) will in respect of any jurisdiction other than the state of Delaware be deemed to include what most nearly approximates in that jurisdiction to the Delaware state legal term;
- (n) any reference to this Agreement or any other agreement or document shall be construed as a reference to that agreement or document as it may have been, or may from time to time be, amended, varied, novated, replaced or supplemented;
- (o) words importing the singular include the plural and vice versa and words importing a gender shall include every gender;
- (p) if a period is specified by reference to dates from a given day or from the day of an act or event, it is to be calculated exclusively of that day unless otherwise expressly provided;
- (q) references to writing include any mode of reproducing words in a legible form and reduced or reducible to paper, but does not include e-mail communications;
- (r) references to this Agreement will include the Schedules, which comprise schedules and exhibits to this Agreement and form part of this Agreement.

1.3 Other Matters

The Parties have participated jointly in the negotiation and drafting of this Agreement. In the event that an ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the Parties and no presumption or burden of proof shall arise favouring or disfavouring any Party by virtue of the authorship of any provisions of this Agreement.

1.4 Obligations of the Purchasers

The obligations of the Purchasers under this Agreement shall be several and not joint.

2. PURCHASE AND SALE OF THE PARTICIPATORY INTEREST

2.1 Purchase and Sale of the Participatory Interest

Subject to the terms of this Agreement, the Seller hereby agrees to sell to Purchaser 1 the Participatory Interest 1, and to Purchaser 2 the Participatory Interest 2, in each case free from all Encumbrances and together with all rights that attach (or may in the future attach) to it, and Purchaser 1 agrees to pay for the Participatory Interest as set out in Clause 2.2.

2.2 The Purchase Price

The total consideration for the Participatory Interest shall be the Purchase Price - Total, which shall be payable by Purchaser 1 as follows:

- (a) The Purchase Price – Cash Portion shall be paid by Purchaser 1 by transferring the full amount thereof by wire transfer into the Escrow Account not later than the Completion Date. However, Purchaser 1 shall not be required to proceed with this wire transfer unless the conditions to Completion indicated in Clause 3.1 hereof are met.
- (b) The Purchase Price – Penalty Offset Portion shall be paid by Purchaser 1 at Completion by entering into the Agreement and Acknowledgement Regarding Penalty Payment and performing the offset provided for therein.

2.3 The Escrow Account and Release of Funds

The Parties agree as follows:

- (a) the amount of one million seven hundred fifty thousand Dollars (USD 1,750,000) shall be released from the Escrow Account to the Seller upon the transfer of ownership of the entire Participatory Interest in the Company to the Purchasers (which shall be, in accordance with Applicable Law, the moment of making in the EGRUL of a respective entry as to same), and the Parties shall jointly instruct the Escrow Agent to so release such amount to the Seller as soon as such entry is made in the EGRUL; and
- (b) the Refund Amount shall be disbursed from the Escrow Account in accordance with the provisions of Clauses 2.4, 5.2 and 5.7, and the Parties shall jointly instruct the Escrow Agent to release all or any portions of the Refund Amount (up to the amount remaining in the Escrow Account) in accordance with such Clauses.

2.4 Partial Refund of the Purchase Price

- (a) The Purchase Price (Purchase Price – Cash Portion) may be subject to a full or partial refund as provided in this Clause 2.4 or in Clauses 5.2 or 5.7. Any such refund shall operate as a reduction in the Purchase Price – Total paid for the Participatory Interest.
- (b) All of the Refund Amount or, if less, the portion of it then remaining in the Escrow Account, shall be paid to Purchaser 1 pursuant to the provisions of Clause 5.2 if the Tech Transfer is not completed by the Review Date.
- (c) All or a portion of the Refund Amount (up to the total amount then remaining in the Escrow Account) shall be paid to Purchaser 1 if the Company experiences a Cash Shortage as determined pursuant to Clause 5.7.
- (d) If on the Review Date, the Tech Transfer has been completed and any part of the Refund Amount remains in the Escrow Account, all such remaining funds shall be paid to the Seller by the provision to the Escrow Agent of the relevant joint instructions not later than five (5) Business Days after the Review Date.

2.5 Equipment Contribution and Intellectual Property Contribution by Seller

- (a) Prior to Completion, the Seller shall irrevocably and unconditionally contribute to the Company, as a contribution to its assets (under article 27 of the LLC Law), the equipment listed in Schedule 11 hereto (which schedule is in the Russian language), which is comprised of one set of production and test equipment needed to produce CFP2–LR4 and one set of production and test equipment needed to produce AAWG (100 GHz) (the "**Equipment Contribution**").
- (b) Prior to Completion, the Seller shall irrevocably and unconditionally contribute to the Company, as a contribution to its assets (under article 27 of the LLC Law), the rights to use intellectual property under the Manufacturing License Agreement (the "**Intellectual Property Contribution**").
- (c) For the avoidance of doubt, the Seller shall not be entitled to demand any payment from the Company or the Purchasers in connection with the Equipment Contribution or Intellectual Property Contribution.

2.6 Limitation of Liability of Seller

For the avoidance of doubt, this Clause 2.6 and Schedule 12 shall not apply to any obligations of the Seller or its subsidiaries pursuant to the Escrow Agreement (or this Agreement with regard to the Refund Amount), the Technical Services Agreement, the Manufacturing License Agreement, the Components Supply Agreement, or any Purchase Order placed pursuant to Clause 5.5. The limitation of liability of the Seller pursuant to this Clause 2.6 also shall not apply in case of fraud on the part of the Seller.

- (a) The aggregate liability of the Seller under any provision of this Agreement (except the provisions of Clause 5.5) is limited to the sum of two hundred fifty thousand US Dollars (USD 250,000) plus any amounts paid to Purchaser 1 as the Refund Amount (such sum the "**Liability Limit**").
- (b) The Purchasers hereby consent and agree that with the exception of the provisions of Clause 5.5, after Completion neither the Seller nor any Affiliate of the Seller shall have any liability to the Purchasers whatsoever in excess of the Liability Limit for any obligation under this Agreement. The Purchasers shall indemnify and hold harmless the Seller from any losses, damages, liabilities, costs, charges and expenses (including all legal costs and consultants' fees) arising out of, or in connection with, any breach by the Purchasers of this Clause 2.6.
- (c) The liability of the Seller pursuant to the Seller's Warranties is further limited by the provisions of Schedule 12 (Seller's Protection) hereto.

3.COMPLETION

3.1Completion

- (a) Subject to the terms and conditions of this Agreement, the signing of the Notarized SPA with respect to the Participatory Interest (the "**Completion**") will take place at a location to be agreed by the Parties and on such date as the Parties may mutually determine (the "**Completion Date**"). No Party shall be required to proceed to Completion unless:
- (i) the Notarized SPA covers the purchase of the entire Participatory Interest simultaneously in accordance with the terms and conditions set forth in this Agreement;
 - (ii) all Transaction Documents (including Non-Assert Covenant in the form of Exhibit D to the Manufacturing License Agreement) are executed by all parties thereto at or prior to the Completion, and
 - (iii) the Long Stop Date has not yet occurred.
- (b) The Purchasers shall not be required to proceed with Completion unless:
- (i) the Equipment Contribution and the Intellectual Property Contribution are completed and the Purchasers receive appropriate evidence thereof, in form and substance satisfactory to the Purchasers;
 - (ii) the FAS Consent is received by Purchaser 1;
 - (iii) EGRUL does not contain any entry on the incorrectness of information contained therein with regard to the Company;
 - (iv) there are no circumstances that are reasonably likely to result, under Applicable Law, in the Russian Tax authorities refusing to register the transfer of ownership of the Participation Interest to the Purchasers pursuant to the Notarized SPA; and
 - (v) no Material Adverse Effect occurs with respect to the Company.
- (c) The Seller shall not be required to proceed with Completion unless the Seller receives evidence of the payment by Purchaser 1 of the Purchase Price – Cash Portion to the Escrow Account.

3.2Seller's Deliveries on Completion Date

Immediately prior to Completion, the Seller shall deliver the following to the Purchasers:

- (a) an original extract from the EGRUL dated not earlier than fourteen (14) days before the Completion Date in respect of the Company;
- (b) the appropriate corporate approvals of the Seller approving the sale of the Participatory Interest to the Purchasers;
- (c) evidence that the Seller has completed the Equipment Contribution and the Intellectual Property Contribution to the Company, in form and substance satisfactory to the Purchasers;
- (d) the decision of the Seller, as the sole participant in the Company, on the termination of the powers of the current board of directors of the Company and the appointment of new members of the board of directors as nominated by Purchaser 1;
- (e) evidence that the Seller has paid the Outstanding Indebtedness to the Company, in form and substance satisfactory to the Purchasers;
- (f) written confirmation of the Seller that the warranties indicated in Schedule 13 hereof are true and correct as of the Completion Date;
- (g) written confirmation of the Seller that no Material Adverse Effect has occurred with respect to the Company.

3.3Purchasers' Deliveries on Completion Date

Immediately prior to Completion, the Purchasers shall deliver copies of the following documents to the Seller (in the Russian language only):

(a) the Constitutive Documents of each Purchaser;

(b) the appropriate corporate approvals of such Purchaser approving the purchase of the relevant portion of the Participatory Interest by such Purchaser from the Seller; and

(c) the FAS Consent.

3.4 Notarized SPA

At Completion, the Parties shall execute and cause to be notarized by a Russian notary the Notarized SPA and shall direct the notary to file the respective application to the Russian tax authorities in connection with the transfer of ownership under the Notarized SPA.

3.5 Payments

Payment of the Purchase Price – Total shall be made in accordance with Clause 2.2 hereof.

3.6 Notice to the Company

The Seller shall notify the Company of the sale of the Participatory Interest in writing within five (5) Business Days after the Completion Date.

4. WARRANTIES AND UNDERTAKINGS

4.1 Parties' Warranties

Each Party to this Agreement hereby warrants to the other Parties that as at the date of this Agreement (each warranty being deemed to be repeated as at the Completion Date):

(a) it is duly organised, validly existing and in good standing under the Applicable Laws of the jurisdiction of its incorporation and has full corporate power and authority to enter into and perform its obligations under this Agreement and all actions (corporate or otherwise, including the approval by the board of directors) have been taken by it that are necessary for it to execute and perform its obligations under this Agreement. The signatories hereof on its behalf have been duly authorised by such Party to sign, execute and deliver this Agreement;

(b) the execution of and performance of its obligations under this Agreement do not:

(i) breach any provision of any Applicable Laws, which breach may have a Material Adverse Effect on its ability to perform its obligations under this Agreement; or

(ii) breach any order, judgment or decree of any Governmental Authority or any agreement or instrument by which it is bound, which breach may have a Material Adverse Effect on its ability to perform its obligations under this Agreement;

(c) its obligations under this Agreement are legal, valid and binding obligations enforceable against it in accordance with its terms subject to Applicable Law of general application; and

(d) it has obtained all Consents and other third parties' consents and approvals which are required under Applicable Laws and which are necessary for it to enter into and perform its obligations under this Agreement, and all such consents and approvals are in full force and effect and all conditions thereof have been complied with.

4.2 Additional Warranties

In addition to the warranties set out in Clause 4.1, the Seller warrants to the Purchasers in terms of the warranties set out in Schedule 12 (the "Seller's Warranties") on the Signing Date which shall be deemed to be repeated as at the Completion Date.

4.3 Purchasers' Warranties

Each Purchaser warrants to the Seller that such Purchaser is in compliance with all applicable anti-money laundering regulations and procedures within its jurisdiction with respect to the source of funds used to purchase its respective share of the Participatory Interest.

4.4 Conduct after the Signing Date

Between (a) the Signing Date and (b) the earlier of the transfer of ownership of the Participatory Interest to the Purchasers or the Termination Date, the Seller shall not dispose of or encumber the Participatory Interest (or any part thereof) and shall not exercise any rights (including voting rights) with respect to the Participatory Interest (or any part thereof) or take any actions pertaining to the Participatory Interest (or any part thereof) (other than actions directly contemplated in this Agreement) without the approval of Purchaser 1.

5.POST-COMPLETION COVENANTS

5.1Transition

After the Completion, Purchaser 1 will be entitled to possession of all documents, books, records, agreements, and financial data of any sort relating to the Company. The Seller shall also ensure that the Company receives the relevant Russia customer list and contacts for CFPS-LR4 not later than the Completion Date.

5.2Completion of Tech Transfer and Reduction of the Purchase Price for failure to complete

- (a)As an inducement to the Purchasers to enter into this Agreement and purchase the Participatory Interest, the Seller undertakes to use its best efforts to procure consummation and completion of the Tech Transfer from the Seller to the Company by the Review Date, to enable the Company produce AAWGs (100GHz) and 50 CFP2-LR4s.
- (b)Without the prejudice to the generality of the obligation of the Seller to use its best efforts to procure completion of the Tech Transfer as soon as possible, the Seller shall use its best efforts to provide the following assistance to the Company (which list, for the avoidance of doubt, is not exhaustive):
 - (i) technology transfer and manufacturing assembly and test training as required for the Company to support its production in Moscow at the Company's facility of AAWGs (100GHz) and CFP2-LR4s;
 - (ii) logistics to transfer the equipment constituting the Equipment Contribution to the Company's Moscow, Russia facility;
 - (iii) technical support and assistance at the Company's Moscow, Russia facility to set up and operate the equipment constituting the Equipment Contribution at Moscow facility; and
 - (iv) ongoing, reasonable, remote technical support and assistance as requested by the Company through the Review Date in support of the Tech Transfer.
- (c)The Seller undertakes to provide the abovementioned assistance to the Company and other assistance as reasonably required to complete the Tech Transfer as an inducement for the Purchasers to enter into this Agreement. For the avoidance of doubt, neither the Company nor any of the Purchasers shall be required to make any separate payment to the Seller in connection with the Seller's assistance, actions and services related to the Tech Transfer, including the assistance expressly mentioned in this Clause 5.2. For the further avoidance of doubt, the Technical Services Agreement does not and shall not cover any services and assistance from the Seller to the Company in connection with the Seller's obligations to procure consummation and completion of the Tech Transfer and shall only govern the relations of the Company and the Seller after the Tech Transfer is completed.
- (d)If by the Review Date, the Tech Transfer has not been completed, the Seller and Purchaser 1 shall instruct the Escrow Agent to return the Refund Amount, or any portion thereof then remaining in the Escrow Account, to Purchaser 1 not later than seven (7) Business Days after the Review Date.
- (e)For the avoidance of doubt, the Tech Transfer will not be deemed completed unless and until each and every item listed in the definition of "Tech Transfer" indicated in Clause 1.1 hereof is completed and respective confirming documents (including those expressly indicated in the definition of "Tech Transfer") are provided to Purchaser 1.

5.3Use of NeoPhotonics Name

By 30 September 2019, Purchaser 1 shall

- (a)cause the Company to cease the use of any trademark or trade name containing the word "NeoPhotonics"; and
- (b)use its reasonable efforts to cause the name of the Company to be changed to exclude the word "NeoPhotonics".

Purchaser 1 shall provide the Seller with documentary evidence or written confirmation thereof.

5.4 Company Operations

Until the earlier of (i) the Review Date, (ii) completion of the Tech Transfer, or (iii) complete depletion of funds in the Escrow Account, Purchaser 1 shall use its reasonable efforts to cause the Company (to the extent within control of Purchaser 1):

- (a) to provide to the Seller, within 10 Business Days of the end of each calendar month, copies of (i) management financial statements of the Company for such month in the same format and containing the same types of information as the financial reports produced by the Company in 2018 prior to the date hereof, as soon as such reports become available and (ii) bank statements with respect to each bank account of the Company open during such calendar month, and
- (b) to substantially adhere to the Budget or to receive the prior approval of the Seller for substantial deviations from the Budget.

5.5 Production Purchase Obligation

- (a) If, by the earlier of (i) 90 calendar days from the Review Date or (ii) 90 calendar days from the completion of the Tech Transfer, the Company produces AAWGs (100GHz) and CFP2-LR4s that meet the Seller's production specifications and yield targets set out in Schedule 9, then the Seller shall cause NeoPhotonics China or NeoPhotonics Dongguan (or any combination thereof) to purchase up to 100 such AAWGs (100 GHZ) and up to 50 CFP2 – LR4s, in each case in the amount produced by such date (for the avoidance of doubt, not less than the amount produced by such date but not more than 100 AAWGs (100 GHZ) and 50 CFP2 – LR4s), at the following prices:

(i) USD 285 per AAWG (100 GHZ) and

(ii) USD 1,150 per CFP2-LR4

(collectively the “**Production Purchase**”) pursuant to the terms of the applicable Purchase Order, the forms of which are attached hereto as Schedule 7. For the avoidance of doubt, the Seller shall have no obligation to purchase (or to cause any of its subsidiaries to purchase) any production completed after such date.

- (b) For the avoidance of doubt, the Seller shall cause NeoPhotonics China and NeoPhotonics Dongguan not to require any special terms for the Production Purchase other than those expressly set out herein or in the attached Schedule 7 and shall cause them to execute any further documents, including the entry into separate purchase and sale agreements, if required by Applicable Law and/or reasonably requested by the Company to complete the Production Purchase.
- (c) If any prepayment is made in connection with the Production Purchase but no (or insufficient) AAWGs (100GHz) or CFP2-LR4s are produced by the Company within the timeframes indicated therefor in the relevant purchase order from NeoPhotonics China or NeoPhotonics Dongguan, such purchase order or relevant purchase-sale agreement shall provide for the immediate refund of all or a pro-rata portion of such prepayment, and Purchaser 1 shall use reasonable efforts to cause the Company to so refund any such prepayment or portion thereof.
- (d) The Parties agree that the Company is a third party beneficiary of the provisions of this Clause 5.5 and may enforce them against the Seller in its own name. In any such enforcement action against the Seller, the Company shall follow the arbitration provisions hereof *mutatis mutandis*, but as if the term “Purchasers” or “Purchaser 1” therein referred to the Company.

5.6 Anti-Money-Laundering Compliance

The Purchasers acknowledge that due to anti-money laundering regulations within their respective jurisdictions, the Seller and/or any person acting on behalf of the Seller may require further documentation verifying either Purchaser's identity and the source of funds used to purchase such Purchaser's share of the Participatory Interest, and each Purchaser further agrees to provide the Seller at any time with such information as the Seller determines to be necessary and appropriate to verify compliance with the anti-money laundering regulations of any applicable jurisdiction or to respond to requests for information concerning the identity of the Purchasers from any Governmental Authority, self-regulatory organization or financial institution in connection with its anti-money laundering compliance procedures, and to update such information as necessary.

5.7 Company cash monitoring

(a)The Seller and Purchaser 1, acting through their representatives, shall hold monthly meetings (whether in person or via electronic means) on or about 14 December 2019, 15 January 2019, 15 February 2019 and 15 March 2019 (each – a "**Target Date**") in order to review whether the cash flow and cash balances of the Company are enough to secure the Company's operations throughout the month until the next Target Date based on the objective to accomplish the Tech Transfer no later than the Review Date. Each monthly meeting shall result in a decision on whether the Company needs additional funds to continue operations and timely complete the Tech Transfer (a "**Cash Shortage**").

(b)If the Parties determine that the Company faces a Cash Shortage, then the Seller and Purchaser 1 shall (i) in good faith agree on the amount of funds to be released from the Escrow Account to Purchaser 1 for further financing by Purchaser 1 of the Company (such amount not to exceed the balance of the Escrow Account at such time and not to exceed the Refund Amount in any event), and (ii) issue respective instructions to the Escrow Agent for the immediate release of such amount to Purchaser 1 not later than three (3) Business Days after the respective meeting.

5.8 Components Supply Agreement Provisions

(a)The Seller agrees that an agreement substantially in the form of the Components Supply Agreement will be executed between NeoPhotonics China or NeoPhotonics Dongguan, on the one hand, and the Company, on the other hand. The initial product and price list under the Components Supply Agreement will be in effect for the 2019 and 2020 calendar years and will include all (i) "Bill of Materials" items and (ii) payment terms of 30 days from invoice (which invoice shall not be issued by the seller until shipment); after such period the Company and the seller under the Components Supply Agreement will need to negotiate annual prices.

(b)In the event of a change of control of the Company such that Purchaser 1 is no longer the owner of at least 50.1% of the equity in the Company, the Company will need to undergo an evaluation of its credit and ability to pay by the seller of the components. Such evaluation may result in the change of payment terms, including the institution of a requirement for prepayment (but, for the avoidance of doubt, the purchase price for the relevant components agreed for that year shall not be increased).

5.9 Anti-Corruption Compliance

(a)In performing their obligations under this Agreement, the Parties, their affiliates, employees or agents shall not:

(i)pay, offer to pay and not allow to pay any monetary funds or values, directly or indirectly, to any persons to influence the actions or decisions of such persons in order to obtain any undue advantages or for other unlawful purposes, or

(ii)perform any actions qualified by anticorruption law as giving/receiving bribes, commercial bribery, and actions that violate the requirements of Applicable Law on counteracting the legalization (laundering) of proceeds from crime.

(b)For the purposes of this Clause 5.9, "**Counterparty**" shall mean the Seller, on the one hand, or the Purchasers collectively, on the other hand, and the Purchasers collectively shall be represented by Purchaser 1. In the event that a Counterparty becomes suspicious that a violation of any provisions of this Clause has occurred or may occur, such Counterparty (the "**Notifying Counterparty**") shall notify the other Counterparty (the "**Responding Counterparty**") in writing. In the written notification, the Notifying Counterparty shall refer to the facts or provide materials that reliably confirm or give grounds for believing that a violation of any provisions of anticorruption legislation or Applicable Law on counteracting the legalization (laundering) of proceeds from crime was committed or may be committed by the Responding Counterparty, its affiliates, employees or agents.

(c)After written notification, the Notifying Counterparty shall have the right to suspend performance of its obligations under this Agreement until it receives written confirmation from the Responding Counterparty that no violation has occurred or will occur.

(d)In the absence of such written confirmation from the Responding Counterparty within ten (10) Business Days of the receipt of the notice from the Notifying Counterparty, the Notifying Counterparty shall have the right to commence a dispute resolution proceeding pursuant to Clause 9.2 for the purpose of terminating this Agreement.

(e)Each Counterparty agrees to provide documents and information reasonably requested by the other Counterparty for the purposes of such other Counterparty's anticorruption compliance.

6. EXPENSES

- (a) Unless otherwise provided for herein, each of the Parties will pay all its own costs, including legal, accounting and other fees, costs and expenses incurred by such Party (including any Taxes) in connection with its negotiation of, and performance under, this Agreement.
- (b) Purchaser 1 shall pay the fees and expenses charged by the Russian notary public in connection with notarizing the Notarized SPA.

7. NOTICES

Purchaser 1 shall act as agent for Purchaser 2 with respect to any notices to be given to or received by Purchaser 2 under this Agreement. Any notice and other communication given or made under or in connection with this Agreement will be in writing in the English language, and will be deemed to have been duly given or made on the date of delivery, only if delivered by hand, by fax or by courier, or made by electronic mail if its receipt is confirmed by the recipient, provided however that if such notice or other communication is sent on a day that is not a Business Day or after 4:00 p.m. at the time of the recipient on a Business day, it will instead be deemed to have been given or made on the next Business Day to the following addresses (or such other addresses as may be from time to time notified by the Parties pursuant to this Clause 7):

If to either or both of the **Purchasers**:

Address: office 708.1, 10A, Prospekt 60-letiya Oktyabrya
Moscow 117036, the Russian Federation
Attention: Yuri Udaltsov, Dmitry Akhanov
Email: Dmitry.Akhanov@rusnano.com

Yurii.Udaltsov@rusnano.com
Facsimile No.: +7 495 988 5399

If to the **Seller**:

Address: 2911 Zanker Road, San Jose, CA 95134, USA
Facsimile No.: +1 (408) 321-5018
Attention: General Counsel
Email: Legal@neophotonics.com

8. VALIDITY; TERMINATION

8.1 Effectiveness

This Agreement will enter into force on the date hereof and (other than obligations that have already been fully performed) will remain in full force and effect after Completion.

8.2 Termination

This Agreement will terminate and the Transactions contemplated hereby will be abandoned at any time prior to Completion by mutual written agreement of the Parties or, after the Long-Stop Date, by written notice given to the other Parties by either the Seller or Purchaser 1.

8.3 Effect of Termination

If this Agreement is validly terminated pursuant to Clause 8.2, this Agreement will forthwith become null and void and there will be no liability or obligation on the part of the Seller or the Purchasers (or any of their respective officers, directors, employees, agents or other representatives or Affiliates), except that the Surviving Provisions will continue to apply following any such termination.

9. GOVERNING LAW AND JURISDICTION

9.1 Governing Law

This Agreement and any agreement or document entered into pursuant to this Agreement and any dispute or claim arising out of or in connection with any of them (including any contractual or non-contractual obligation, dispute, controversy or claim arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination on-contractual disputes or claims) and the relationship of the Parties shall be governed by and construed in accordance with the

laws of the State of Delaware, United States of America, unless the relevant agreement or document expressly provides otherwise.

9.2 Arbitration

- (a) This Agreement and any disputes or claims arising out of or in connection with its subject matter or formation (including any contractual or non-contractual obligation, dispute, controversy or claim arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination on-contractual disputes or claims), including any question regarding its existence, validity or termination will be referred to and finally resolved by Arbitration Institute of the Stockholm Chamber of Commerce under Arbitration Rules of the Arbitration Institute of the Stockholm Chamber of Commerce (the "**Rules**"). The place of arbitration shall be Stockholm. The arbitration shall be in English. There shall be 3 arbitrators appointed in accordance with the Rules, provided that Purchaser 1 shall be the Party responsible for the appointment of an arbitrator for both Purchasers.
- (b) The Parties agree that they will not deprive any court or other Governmental Authority of their respective countries of the right to make injunctions or in enforcement of arbitral awards; however, the Parties agree that they may seek temporary court or administrative decisions or injunctions only if a request for arbitration shall have been made under the Rules and such injunctions are not in conflict with their arrangements regarding dispute resolution set out in this Clause 9.2.

10. CONFIDENTIALITY; ANNOUNCEMENTS

10.1 Confidentiality

- (a) Each Party shall at all times:
- (i) use its reasonable endeavours to keep all data or information (whether technical, commercial or financial) acquired under or pursuant to this Agreement (including information relating to the other Party's products, operations, processes, plans or intention, product information, know-how, design rights, trade secrets, market opportunities and business affairs, as the case may be) strictly confidential and shall not disclose this to any other person; and
 - (ii) not use any data or information referred to in paragraph (i) above for any purpose other than in relation to the proper performance of its obligations and exercise of its rights under this Agreement.
- (b) The provisions of this Clause shall not apply to:
- (i) any information in the public domain otherwise than by breach of this Agreement;
 - (ii) information in the possession of a Party before that information was disclosed to it by or on behalf of the other Party and which was not obtained under any obligation of confidentiality; or
 - (iii) information obtained from a Party who is free to disclose it, and which is not obtained under any obligation of confidentiality.
- (c) A Party shall be entitled to disclose any data or information referred to above without the prior written consent of the other Party if such disclosure is made in good faith:
- (i) to any Affiliate of such Party, having made it aware of the requirements of this Clause 10;
 - (ii) to any outside consultants or advisers engaged by or on behalf of such Party and acting in that capacity, having made them aware of the requirements of this Clause 10;
 - (iii) to the extent required by any Applicable Laws or pursuant to an order of any court of competent jurisdiction or in connection with a planned or current offering and/or listing of securities or derivative instruments of it or any of its Affiliate on any stock exchange (including foreign stock exchanges) or other securities trading venues in the securities market in accordance with the rules of such stock exchange or securities trading venue;
 - (iv) to any insurer under a policy of insurance; or
 - (v) to directors, employees and officers of such Party having made them aware of the requirements of this Clause 10.

(d)Any Party shall be entitled to disclose this Agreement to the Company.

(e)Purchaser 1 shall be entitled to disclose this Agreement and any information pertaining to this Agreement (including schedules hereto and agreements concluded pursuant to this Agreement) to a prospective purchaser of a participatory interest in the capital of the Company or a prospective investor in the Company.

10.2Announcements

No Party may make or send a public announcement, communication or circular concerning the transactions referred to in this Agreement or in relation to its provisions unless:

(a)it has first obtained the other Party's written consent (not to be unreasonably withheld, conditioned or delayed) as to its content and the manner and extent of its publication;

(b)it is required to do so under Applicable Laws to the extent required by any Applicable Laws or pursuant to an order of any court of competent jurisdiction or in connection with a planned or current offering and/or listing of securities or derivative instruments of it or any of its Affiliate on any stock exchange (including foreign stock exchanges) or other securities trading venues in the securities market in accordance with the rules of such stock exchange or securities trading venue.

11.GENERAL PROVISIONS

11.1Further Assurances

Each of the Parties agrees to perform (or procure the performance of) all further acts and things and execute and deliver (or procure the execution and delivery of) such further documents, as may be required by Applicable Laws or as may be necessary or reasonably required by the other Party to implement and give effect to this Agreement and the transactions contemplated hereby for the purpose of vesting in and securing to such Party the full benefit of this Agreement (including the execution of all deeds and documents, procuring the convening of all meetings, the giving of all necessary waivers and consents and the passing of all resolutions and otherwise exercising all powers and rights available to it).

11.2Assignments

(a)Each Party is entering into this Agreement for its benefit and not for the benefit of another person.

(b)Except as set out herein, no Party may, without the prior written consent of the other Parties, transfer or assign to any other person any of its rights and obligations hereunder, provided that each Purchaser may assign any of its rights under this Agreement to any member of such Purchaser's group from time to time or to the purchaser of the majority Participatory Interest in the Company provided such purchase occurs on or prior to 31 December 2019.

(c)A Party may not subcontract the performance of any of its obligations under this Agreement without having first obtained the other Party's written consent.

(d)This Agreement shall be binding upon, and inure to the benefit of the Parties and their respective successors and their permitted assignees. Subject to and upon any succession or assignment permitted by this Agreement, any successor or permitted assignee shall in its own right be able to enforce any term of this Agreement in accordance with its terms as if it were in all respects a party hereto.

11.3Entire Agreement

The Parties agree that the Transaction Documents, together with any other documents executed in furtherance thereof, constitute, in the absence of fraud, the whole and only agreement between the Parties and supersede all previous agreements whether written or oral between all or any of the Parties in relation to the subject matter of the Transaction Documents.

11.4Amendments

No variation of this Agreement will be valid unless it is in writing and signed by or on behalf of each of the Parties.

11.5No Waiver

No waiver by a Party of any breach of a provision of this Agreement will be effective unless in writing duly executed by a duly authorised representative of the Party granting such waiver. Any such waiver will relate only to the breach to which it expressly relates and will not apply to any subsequent or other breach, and the giving of any time or indulgence will not constitute a

waiver.

11.6 Liabilities, Rights and Remedies

- (a) Except where this Agreement expressly provides to the contrary, the rights and remedies contained in this Agreement are cumulative and not exclusive of rights and remedies provided by law.
- (b) The failure to exercise or delay in exercising a right or remedy under this Agreement will not constitute a waiver of the right or remedy or a waiver of any other rights or remedies and no single or partial exercise of any right or remedy under this Agreement will prevent any further exercise of the right or remedy or the exercise of any other right or remedy.
- (c) Without prejudice to any other rights or remedies that a Party may have against any other Party, each Party acknowledges and agrees that damages alone would not be an adequate remedy for any breach by it of the provisions of this Agreement and that accordingly the other Parties shall be entitled, without proof of special damages, to the remedies of injunction, specific performance or other equitable relief for any threatened or actual breach of the provisions of this Agreement.

11.7 Relationship of the Parties

This Agreement shall not be construed to create a partnership between the Parties or to impose any partnership obligation or liability upon any of the Parties and none of the Parties shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

11.8 Severance

The invalidity, illegality or unenforceability of any provision (or part of a provision) of this Agreement will not affect or impair the enforceability of the remainder of this Agreement. If any invalid, illegal or unenforceable provision would be valid, enforceable or legal if some part of it were deleted, the provision shall apply with whatever modification is necessary to give effect to the commercial intention of the Parties.

11.9 Language

The language of this Agreement is English and, unless otherwise indicated herein, all documents, waivers and all other written communication or otherwise between the Parties in connection with this Agreement shall be in English.

11.10 Agreement Survives Completion

Except to the extent that they have been performed and except where this Agreement provides otherwise, the obligations contained in this Agreement remain in force after Completion.

11.11 Payments

- (a) Save as otherwise provided herein, any payment to be made by any Party under this Agreement shall be made in full without any set off, restriction, condition or deduction for or on account of any counterclaim including without limitation any withholding or deduction for the account of any Tax save where such withholding is required by Applicable Law.
- (b) If any Party is required by law to withhold or make a deduction in respect of Tax on any sum payable under this agreement, the Party shall, at the same time as the sum which is the subject of the deduction or withholding is payable, make a payment to the other party of such additional amount as shall be required to ensure that the net amount received by the other Party will equal the full amount which would have been received by it had no such deduction or withholding been required to be made.
- (c) Where under the terms of this Agreement one Party is liable to reimburse another Party in respect of any costs, charges or expenses, the payment shall include an amount equal to any VAT thereon not otherwise recoverable by the other Party, subject to that Party using all reasonable endeavours to recover such amount of VAT as may be practicable.
- (d) If any payment under this Agreement constitutes the consideration for a taxable supply for VAT purposes, then in addition to that payment the payer shall pay any VAT due.

11.12 Counterparts

This Agreement may be executed in one or more counterparts, each of which when executed and delivered will be deemed to

be an original and all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, this Agreement has been duly executed and delivered as a deed on the date first above written.

(Signatures on the last page)

SCHEDULE 1

AGREEMENT AND ACKNOWLEDGEMENT REGARDING PENALTY PAYMENT

This Agreement and Acknowledgement Regarding Penalty Payment (this “**Agreement**”), is entered into on the date last signed below by and between NeoPhotonics Corporation, having a principal place of business at 2911 Zanker Road, San Jose, CA 95134 USA (“**Company**”) and Joint Stock Company “RUSNANO” (Principal State Registration Number 1117799004333, with registered office at Prospect 60-letiya Oktabrya 10a, 117036 Moscow, Russian Federation) (“**Rusnano**”), (each a “**Party**” and collectively the “**Parties**”).

Recitals

Whereas, the Parties hereto have previously executed that certain Rights Agreement, dated and effective as of April 27, 2012, the Extension to Milestone Date, dated and effective February 26, 2015, the Amendment to Rights Agreement, dated and effective as of June 30, 2015, and Amendment Two to Rights Agreement, dated and effective as of August 2, 2016, (collectively as amended, the “**Rights Agreement**”);

Whereas, Rusnano and its affiliate are acquiring NeoRussia (as defined below) pursuant to that certain Framework Purchase Agreement dated [•] (the “**Acquisition Agreement**”);

Whereas, after completion of the Acquisition Transaction (as defined below) the Company will not invest any further funds for the development of NeoRussia initially envisaged by the Rights Agreement and thus will not fulfill its obligation to invest in the Company an amount not less than USD 30,000,000 by the end of 2019, accordingly triggering the penalty obligation set forth in Section 6(e)(iii) (D)(h) of the Rights Agreement in the amount of USD 2,000,000 (the “**Penalty Payment**”);

Whereas, in connection with the sale transaction contemplated by the Acquisition Agreement, the Parties have mutually agreed to enter into this Agreement to confirm their mutual agreement regarding the treatment and full satisfaction of the Penalty Payment;

All capitalized terms used but not defined herein shall have the meanings ascribed to such terms in the Rights Agreement.

Agreement

Definitions:

“**Acquisition Transaction**” shall mean the acquisition of NeoRussia by Rusnano and its affiliate pursuant to the Acquisition Agreement.

“**Completion**” shall mean completion of the transfer of ownership of the entire participatory interest in charter capital of NeoRussia to Rusnano and its affiliate (meaning registration of the relevant transfer of ownership in the Russian unified state register of legal entities) pursuant to the Acquisition Agreement.

“**NeoRussia**” shall mean NeoPhotonics Corporation Limited Liability Company, Principal State Registration Number 1127746681710, with registered offices at Volgogradsky Prospekt 42, building 5, Moscow 109548, Russia.

TREATMENT OF THE PENALTY PAYMENT

a. Immediately upon Completion, the Company shall be obligated to pay Rusnano USD 1,000,000 in partial settlement of the Penalty Payment. Payment of this amount shall be made by offsetting the Purchase Price – Penalty Offset Portion (as defined in the Acquisition Agreement) from the transaction consideration payable by Rusnano to the Company under the Acquisition Agreement (the “*Offset*”).

b. The remainder of the Penalty Payment in the amount of USD 1,000,000 is hereby waived and released by Rusnano effective as of the date of Completion as consideration for the Company’s obligations to provide manufacturing process transition to NeoRussia pursuant to the Acquisition Agreement and related agreements (the “*Obligation Settlement*”).

c. By virtue of the Offset and the Obligation Settlement: (1) no further penalty or other damages shall be payable by the Company under Section 6(e) of the Rights Agreement, and (2) the Company shall not have any further obligations to Rusnano pursuant to Section 6(e) of the Rights Agreement.

II. MISCELLANEOUS:

a. **No Other Modifications.** Except as otherwise expressly set forth in this Agreement, the Rights Agreement shall remain in full force and effect without any modification thereto.

b. **Entire Agreement.** This Agreement, the Rights Agreement and the Acquisition Agreement constitute the full and entire understanding and agreement between the Parties hereto pertaining to the subject hereof.

c. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall be enforceable against the parties actually executing such counterparts, and all of which together shall constitute one instrument.

d. **Effectiveness.** This Agreement shall be effective as of the date of Completion. If the Completion does not occur for any reason, this Agreement shall have no legal effect and shall be null and void. For the avoidance of doubt, if the Completion does not occur, the obligations of the Company pursuant to the Rights Agreement (including the penalty payment obligations) shall be in full force and effect.

[Signature page follows]

In witness whereof, the parties hereto have each caused this Agreement and Acknowledgement Regarding Penalty Payment to be signed and delivered by its respective duly authorized officer, all as of the date last signed below.

<p>NEOPHOTONICS CORPORATION</p> <p>Signature: _____</p> <p>Printed Name: _____</p> <p>Date: _____</p>	<p>JOINT STOCK COMPANY "RUSNANO"</p> <p>Signature: _____</p> <p>Printed Name: _____</p> <p>Date: _____</p>
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SCHEDULE 2

BUDGET

Neo Russia Budget

	October 2018	November 2018	December 2018	January 2019	February 2019	March 2019				
	in USD						NEW TOTAL	Initial Estimate	Difference	Comment
	FX rate @ 65 RUB / \$						65.003			
Beginning Balance - Cash	\$ 131,066	\$ 113,524	\$ 10,901	\$ 37,202	\$ 1,615	\$ 19,368	\$ 131,066	131,066		
Cash Receipts										
NeoUS	126,760	-	153,808	69,460	-	86,000	\$ 436,028	270,380	165,648	Clear Interco Balance
VAT Refund collections	-	104,075	-	69,231	87,615	62,308	\$ 323,229	415,385	(92,155)	VAT Timing push out
Other collections	1,864	-	23,846	-	-	-	\$ 25,710	6,923	18,787	
Total Cash Receipts	128,623	104,075	177,654	138,691	87,615	148,308	784,967	692,688	92,279	
Cash Payments										
Personnel Related	(36,367)	(63,903)	(47,993)	(29,839)	(29,839)	(36,556)	(244,498)	(226,951)	(17,547)	
Retention	(4,652)	(58,150)	(51,460)	-	-	-	(114,262)	(109,610)	(4,652)	
Rent & Office	(30,397)	(12,043)	(12,043)	(12,043)	(12,043)	(12,043)	(90,612)	(90,127)	(486)	
Taxes & VAT	(16,390)	(10,400)	(2,708)	(78,400)	(1,169)	(19,169)	(128,236)	(38,462)	(89,775)	VAT for "Paid in Capital" & Prop Tax
Mfg Expenses	(4,982)	(43,945)	(16,169)	(33,862)	(9,246)	(80,508)	(188,712)	(150,250)	(38,462)	Increased production materials
Outside services	(53,376)	(18,257)	(20,980)	(20,134)	(17,565)	(16,334)	(146,645)	(122,773)	(23,872)	ARO for Shodneskaya office
Total Cash Disbursements	(146,164)	(206,698)	(151,354)	(174,278)	(69,863)	(164,610)	(912,967)	(738,173)	(174,794)	
Ending Balance - Cash	\$ 113,524	\$ 10,901	\$ 37,202	\$ 1,615	\$ 19,368	\$ 3,065	\$ 3,065	\$ 85,580	\$ (82,515)	

SCHEDULE 3

COMPONENTS SUPPLY AGREEMENT

COMPONENTS SUPPLY AGREEMENT

BETWEEN

[NEO CHINA]

and
NEOPHOTONICS CORPORATION, LLC

Effective Date: _____

This Components Supply Agreement (this “**Agreement**”), effective as of the Effective Date set forth on the cover page, is entered into by and between

NEOPHOTONICS CORPORATION, LLC, a company registered in the Russian Federation, main state registration number 1127746681710, located at Volgogradsky Prospekt 42, building 5, Moscow 109548, Russia (hereinafter – the “**Buyer**”);

[**NEO CHINA**], a company incorporated under the laws of [•], registration number [•], located at [•] (hereinafter – “**NeoPhotonics**”).

Recitals

Whereas, Buyer seeks to purchase products pursuant to one or more purchase orders; and

Whereas, NeoPhotonics wishes to cooperate with Buyer in order to fulfill Buyer’s requirements to purchase NeoPhotonics’ products.

Agreement

Now, therefore, subject to the terms and conditions of this Agreement, in consideration of the foregoing premises and the covenants herein contained, the Parties hereby agree as follows:

1. Definitions.

The following terms are integral to this Agreement and shall have the following meaning:

1.1. “**Affiliate**” or “**Affiliated**” means in relation to a person (a) a person directly or indirectly Controlled by, or under common Control with that person; or (b) a person owning or controlling fifty (50) per cent or more of the issued voting securities or beneficial interests of the first person; or (c) a director, partner or member of the immediate family of a director or partner, of the first person and in the case of a trust, any trustee or beneficiary (actual or potential) of that trust.

1.2. “**Control**” means, in relation to a company or other entity: (i) the legal power to secure directly or indirectly that the affairs of such entity are conducted in accordance with his or its wishes, including to direct or cause the direction of its general management and policies; (ii) the ability to appoint, directly or indirectly, the majority of its directors or executive officers; (iii) the ability to exercise, directly or indirectly, a majority of the votes exercisable at a general meeting; or (iv) the right to receive, directly or indirectly, a majority of the proceeds arising from: (a) any declaration of a dividend; or (b) a distribution arising in the course of winding up, whether solvent or insolvent, or any return of capital to shareholders or members; and the expressions Controlled and Controlling shall be construed accordingly.

1.3. “**Delivery Date**” means the date of delivery for ordered Products as set forth in a Purchase Order or as otherwise agreed by the Parties in writing.

1.4. “**Delivery Location**” means the destination(s) set forth in a Purchase Order to which NeoPhotonics shall deliver the Products ordered therein or other location agreed by the Parties in writing.

1.5. “**Effective Date**” means the date set forth on the cover page hereof.

1.6. “**Party**” shall mean any one of the signatories to this Agreement; “**Parties**” shall mean all of the signatories to this Agreement.

1.7. “**Product**” or “**Products**” means the product or products specifically described by title and part number in Exhibit A and in their respective specifications in effect as of the Effective Date.

1.8. “**Purchase Order**” means any individual purchase order that has been issued pursuant to the terms of this Agreement.

2. Scope of Agreement.

2.1. The terms and conditions of the Agreement apply to all quotations for Products issued by NeoPhotonics to Buyer.

2.2. Subject to Section 3.3 and provided that Buyer is not in breach of this Agreement, NeoPhotonics will provide Products under this Agreement under Purchase Orders submitted by Buyer. Buyer shall be liable to NeoPhotonics for any obligation incurred under a Purchase Order or this Agreement by Buyer.

3. Prices and Purchase Orders.

3.1. The price caps listed in Exhibit A shall be valid throughout the calendar years 2019 and 2020. For any period beyond the end of the 2020 calendar year, the Buyer shall request product pricing caps from NeoPhotonics.

3.2. All prices quoted shall be exclusive of transportation, insurance, federal, state, local, excise, value-added, use, sales, property (ad valorem) and similar taxes or duties now in force or hereafter enacted.

3.3. Buyer shall submit a Purchase Order to NeoPhotonics to order Products at the prices quoted. Purchase Orders may be submitted by mail, facsimile, Electronic Mail (“e-mail”) or Electronic Data Interchange. Each Purchase Order shall include the name and part number of the Product ordered, product description, the quantity of Products ordered, the Delivery Location(s) and the requested Delivery Date(s) for the Products.

3.4. NeoPhotonics shall accept or reject a Purchase Order generally within three (3) business days of receipt. NeoPhotonics must act reasonably in rejecting any Purchaser Order from Buyer and must state its reasons for such rejection in writing, provided that for the avoidance of doubt, the Parties agree that NeoPhotonics shall be acting reasonably in rejecting a Purchase Order from the Buyer if at the time of such Purchase Order or delivery thereunder, the Buyer is owned or controlled, directly or indirectly, by a competitor of NeoPhotonics or any of its affiliates. NeoPhotonics’ acceptance of a Purchase Order shall be evidenced by a written acknowledgement of the Purchase Order sent to Buyer.

3.5. NeoPhotonics will generally invoice the Buyer for purchases of Products immediately upon shipment. All invoices shall include the following information: invoice number, invoice/ship date, Purchase Order number, NeoPhotonics part number, number of units shipped, unit price, extended price, tax (if applicable) and invoice total.

3.6. Buyer shall pay all taxes, fees or charges of any nature whatsoever imposed by any governmental authority on, or measured by, the transaction between Buyer and NeoPhotonics, in addition to the prices quoted or invoiced. In the event that NeoPhotonics is required to collect the foregoing, such amounts will appear as separate items on NeoPhotonics’ invoice and paid by Buyer unless Buyer provides NeoPhotonics with a valid

tax exemption certificate authorized by the appropriate taxing authority. Buyer shall provide NeoPhotonics with a valid resale certificate for the Products purchased for resale.

4. Payment Terms.

4.1. Except as set out below, Buyer shall pay all invoices issued under this Agreement in U.S. Dollars within thirty (30) days from date of invoice. In the event of a change of the Buyer such that Joint Stock Company “Rusnano” is no longer the direct or indirect owner of at least 50.1% of the equity in the Buyer, the Buyer will need to undergo an evaluation of its credit and ability to pay by NeoPhotonics. Such evaluation may result in the institution of a requirement for prepayment (but, for the avoidance of doubt, the purchase price for the relevant components set forth in the relevant price caps list for that year shall not be increased). Interest on late payments shall accrue at the rate of one and one half percent (1.5%) per month or the highest legal rate, whichever is lower. Buyer shall pay all of NeoPhotonics’ costs and expenses (including reasonable attorneys’ fees) to enforce and preserve NeoPhotonics’ rights under this Subsection 4.1. Payment terms herein are subject to annual review of the current credit worthiness of Buyer as judged by NeoPhotonics as well as to review in the event that any payment is not received by NeoPhotonics when due.

4.2. Until the purchase price and all other charges payable to NeoPhotonics hereunder have been received in full, NeoPhotonics hereby retains and Buyer hereby grants to NeoPhotonics a security interest on the products delivered to Buyer and any proceeds therefrom. Buyer agrees to promptly execute all documents reasonably requested by NeoPhotonics to perfect and protect such security interest. In the event Buyer fails promptly to execute such documents, Buyer hereby appoints NeoPhotonics attorney-in-fact for the sole purpose of executing such documents, which appointment shall be a power coupled with an interest and shall be irrevocable.

4.3. Should Buyer become delinquent in the payment of any sum due hereunder, NeoPhotonics shall not be obligated to continue performance hereunder, including without limitation shipment of any previously accepted Purchase Orders.

4.4. Buyer warrants to NeoPhotonics that Buyer is financially solvent on the date on which it places an order and expects such entity to be solvent on the date of receipt of shipment. NeoPhotonics reserves the right to change the credit terms provided herein, when in NeoPhotonics’ opinion the financial condition or previous payment record of Buyer so warrants.

5. Delivery Dates.

5.1. NeoPhotonics will use commercially reasonable efforts to meet any delivery date(s) requested in a Purchase Order; provided however, that NeoPhotonics will not be liable under any circumstances for its failure to meet such delivery date(s). Any delivery dates provided by NeoPhotonics to Buyer are best estimates only.

5.2. NeoPhotonics shall have the right to make partial shipments and payment therefore shall be made in the manner described in Section 4.1 above.

5.3. NeoPhotonics shall have the right to make shipments five (5) calendar days before or after the requested delivery date and payment therefore shall be made in the manner described in Section 4.1 above.

6. Packing.

All Products shall be suitably packed, if appropriate, for air freight shipment in NeoPhotonics' standard shipping cartons. All packing will conform to requirements of carrier's tariffs. When special or export packaging is requested or, in the opinion of NeoPhotonics, required under the circumstances, the cost of such special import packaging, if not set forth on the invoice, will be separately invoiced and paid by Buyer.

7. Shipment & Acceptance.

7.1. All Products delivered pursuant to the terms of this Agreement shall be marked for shipment to the location of the Buyer, and delivered to Buyer or its carrier agent [F.O.B. origin] unless otherwise agreed.

7.2. Method of Shipment. Unless otherwise instructed in the Purchase Order, NeoPhotonics shall select the carrier.

7.3. Title and Risk of Loss. At the time of delivery to the [F.O.B. point], (subject to Subsection 4.2) title to such Products and risk of loss shall pass to Buyer. All freight, insurance, and other shipping expenses, as well as any special packing expense, shall be paid by Buyer. Buyer shall also bear all applicable taxes, duties, and similar charges that may be assessed against the Products.

8. Changes and Cancellations.

Buyer may utilize written change orders or cancel Purchase Orders without penalty for Purchase Orders that have not yet been accepted by NeoPhotonics.

9. Term and Termination.

9.1. Term. This Agreement will govern in all Buyer's purchases of the Products from NeoPhotonics for the period until 31 December 2020. Any extension of this Agreement beyond this term shall require the affirmative consent of both Parties.

9.2. Termination for Insolvency. This Agreement shall terminate, without notice, upon:

9.2.1. The institution by or against Buyer of insolvency, receivership or bankruptcy proceedings or any other proceedings for the settlement of Buyer's debts,

9.2.2. Buyer's making an assignment for the benefit of creditors, or

9.2.3. Buyer's written cancellation per 9.4

9.3. Termination for Cause. If Buyer defaults in the performance of any provision of this Agreement, then NeoPhotonics may give written notice to Buyer that if the default is not cured within thirty (30) days of receipt of such notice, this Agreement and/or applicable Purchase Order will be terminated. If NeoPhotonics gives such notice and the default is not cured during the thirty-day period, then the Agreement and/or applicable Purchase Order shall automatically terminate at the end of that period.

9.4. Termination for Convenience. Prior to the termination of this Agreement pursuant to Clause 9.1, the Buyer may terminate this Agreement at any time for any or no reason upon ninety (90) days notice to NeoPhotonics, and NeoPhotonics may terminate this Agreement at any time upon ninety (90) days notice to Buyer if Buyer has not purchased any Products from NeoPhotonics in the preceding 12 calendar months. The termination of this Agreement under this Section 9.4 shall not affect the obligations of either Party to the other

under an Purchase Order existing at the time of such termination, but such Purchase Order shall continue in effect and be subject to the terms and conditions of this Agreement as if this Agreement had not been terminated.

10. Limitation of Liability.

NEOPHOTONICS' LIABILITY ARISING OUT OF THIS AGREEMENT AND/OR SALE OF THE PRODUCTS SHALL BE LIMITED TO THE AMOUNT PAID BY BUYER FOR THE PRODUCTS. IN NO EVENT SHALL NEOPHOTONICS BE LIABLE FOR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS BY ANYONE. IN NO EVENT SHALL NEOPHOTONICS BE LIABLE TO BUYER, OR ANY OTHER ENTITY FOR ANY SPECIAL, CONDITIONAL, CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGES (INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS), HOWEVER CAUSED, ON ANY THEORY OF LIABILITY (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE, BREACH OF CONTRACT OR OTHERWISE) AND WHETHER OR NOT NEOPHOTONICS HAS BEEN NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGE).

11. Import and Export Requirements.

Buyer shall, at its own expense, pay all import and export licenses and permits, pay customs charges and duty fees, and take all other actions required to accomplish the export and import of the Products purchased by Buyer.

12. Miscellaneous.

12.1. Any notice required to be given hereunder shall be given in writing at the address of each party set forth in an attached quotation or purchase order, or to such other address as either party may substitute by written notice to the other.

12.2. The Buyer may assign this Agreement to any third party upon consent of NeoPhotonics; such consent not to be unreasonably withheld or delayed. The Buyer may assign and/or transfer this Agreement and all rights and obligations of the Buyer hereunder without the consent of NeoPhotonics to (i) an Affiliate of the Buyer, or (ii) a person or entity acquiring all or substantial all of the assets of the Buyer, whether by sale, acquisition, merger, operation of law or otherwise, provided that in either case such person is not a competitor of NeoPhotonics or its Affiliates (it being understood and agreed that a "competitor" means an entity deemed by NeoPhotonics and its Affiliates to be a threat to its core business (principally outside of the Russian Federation) due to technology, products or related competitive actions or strategies). For the avoidance of doubt, consent of NeoPhotonics shall not be required for such assignment and/or transfer.

12.3. For the avoidance of doubt, change of Control over the Buyer shall not affect the rights and obligations of the Parties hereunder provided that the person acquiring Control over the Buyer is not a competitor of NeoPhotonics or its Affiliates.

12.4. NeoPhotonics' failure to exercise any of its rights hereunder shall not constitute or be deemed a waiver or forfeiture of such rights.

12.5. Governing law and dispute resolution.

12.5.1. This Agreement shall be governed by the law of the state of Delaware, USA. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded.

12.5.2. This Agreement and any disputes or claims arising out of or in connection with its subject matter or formation (including any contractual or non-contractual obligation, dispute, controversy or claim arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination on-contractual disputes or claims), including any question regarding its existence, validity or termination will be referred to and finally resolved by Arbitration Institute of the Stockholm Chamber of Commerce under Arbitration Rules of the Arbitration Institute of the Stockholm Chamber of Commerce (the "**Rules**"). The place of arbitration shall be Stockholm. The arbitration shall be in English. There shall be 3 arbitrators appointed in accordance with the Rules.

12.6. Language.

12.6.1. This Agreement shall be made in the English language, which language shall be controlling in all respects, and all versions hereof in any other language shall not be binding on the parties hereto. All communications and notices to be made or given pursuant to this Agreement shall be in the English language.

12.6.2. The parties hereto confirm that it is their wish that this Agreement, as well as other documents relating hereto, including notices, have been and shall be written in the English language only.

12.7. The terms and conditions set forth herein represent the entire agreement between NeoPhotonics and Buyer with respect to the subject matter and Buyer agrees that all prior quotations, invoices, negotiations, understandings, representations and/or agreements of the parties relating to the subject matter hereof, whether oral or written, are merged herein and superseded in their entirety. Buyer acknowledges that it has not entered into this Agreement in reliance on any warranty or representation by any person or entity except for the warranties and representations specifically set forth herein. No change or modification of any of the terms or conditions herein shall be valid or binding on either Party unless in writing and signed by an authorized representative of each Party.

12.8. Non-performance of either Party shall be excused to the extent that performance is rendered impossible by strike, fire, flood, governmental acts or orders or restrictions, failure of suppliers, acts of terrorism or war, or any other reason where failure to perform is beyond the reasonable control of and is not caused by the negligence of the non-performing Party. Such excuse shall be effective only for the period of existence of the relevant circumstance rendering performance of this Agreement impossible.

In witness whereof, NeoPhotonics and Buyer have each caused this Agreement to be signed and delivered by its respective duly authorized officer, all as of the Effective Date.

Buyer – NeoPhotonics Corporation, LLC	Seller – [Neo China]
_____	_____
Signature	Signature
_____	_____
Printed Name	Printed Name
_____	_____
Title	Title

Exhibit A: Product Components Price Caps for 2019 and 2020

Products

1. 100G CFP2 Transceiver Components Price Caps for 2019 and 2020 (v1)

CFP2 Component Item	Component Item Description	Unit Total Cost	Usage	Unit	Total cost per module
1000038861	GREASE,THERMALLY CONDUCTIVE GREASE,GAP FILLER 3500LV,CFP DCO	\$0.50	0.8	ml	\$0.40
1000039008	SPRING, WIRE DIA 0.2MM ,CFP2 MODULE	\$0.01	2	EA	\$0.03
1000027627	PAD,THERMAL PAD,100G-M, 1.0MM THICKNESS	\$11.46	0.067	EA	\$0.77
1000027777	GASKET, EMI GASKET FOR LC RECEPTACLE	\$0.07	2	EA	\$0.14
1000030380	COVER, FRONT COVER, FOR 520115064	\$0.84	1	EA	\$0.84
1000030386	INSERT, MODULE SLIDER, FOR 520115064	\$0.40	2	EA	\$0.79
1000030390	LATCH, FOR 520115064	\$0.43	1	EA	\$0.43
1000030391	SHRAPNEL, LC RECEPTACLE SHRAPNEL, FOR 520115064	\$0.19	2	EA	\$0.37
1000034469	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 9MM STAINLESS STEEL	\$0.03	4	EA	\$0.12
1000034471	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 3MM STAINLESS STEEL	\$0.03	3	EA	\$0.08

1000035064	SPACER, ISOLATION SPACER FOR DIE CASTING OF 536155065	\$0.25	1	EA	\$0.25
1000035452	BASE, MODULE BASE FOR DIE CASTING OF 536155065	\$4.72	1	EA	\$4.72
1000035453	LID, MODULE LID FOR DIE CASTING OF 536155065	\$4.47	1	EA	\$4.47
1000035459	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 5MM STAINLESS STEEL FOR DIE CASTING	\$0.03	2	EA	\$0.06
1000035460	COVER, RF ABSORB COVER FOR 536155065	\$83.87	0.029	EA	\$2.43
301-8704-201	PLUG, 10G XFP-40KM(P765F-81-2TD)RUBBER PLUG	\$0.06	1	EA	\$0.06
1000027621	LABEL, LATCH LABEL,LIGHT BLUE	\$0.01	1	EA	\$0.01
502-0705-001	SOLDER, M705 RMA98 SUPER P3 0.5MM	\$0.08	0.05	g	\$0.00
1000025547	LABEL, THE BLANK LABEL, WITH NEO LOGO, 38X15MM	\$0.03	1	EA	\$0.03
1000001761	LABEL, IMPLEMENTATION LABEL, ROLL	\$0.01	0.03	EA	\$0.00
1000026612	PACKAGING BOX, PLASTIC TRAY FOR CFP2_LID	\$0.21	1	EA	\$0.21
1000026613	PACKAGING BOX, PLASTIC TRAY FOR CFP2_BASE	\$0.21	1	EA	\$0.21
1000026614	PACKING FOAM, CFP2 PACKING FOAM	\$0.02	2	EA	\$0.04
1000026615	BOX, CFP2 PACKING BOX	\$0.22	1	EA	\$0.22
350-0201-001	LABEL, TUV AUTHENTICATE LABEL	\$0.01	1	EA	\$0.01
1000037316	LABEL, UL LABEL, 64.5X14.5, LN50	\$0.02	1	EA	\$0.02
350-1210-001	LABEL, ROHS6 LABEL	\$0.01	1	EA	\$0.01
1000033093	LABEL, LASER LABEL, ENGLISH, 60X40	\$0.03	1	EA	\$0.03
1000003543	LABEL,NEW ATTENTION LABEL	\$0.01	0.03	EA	\$0.00
1000042371	OL3183M, COMPONENTS, 100G Q-TOSA, 100G CFP4 LR4, TELECOM&DATACOM, Q-TOSA, PQT-C44C3ELCL-KD, NSZ STD	\$303.35	1	EA	\$303.35
1000042372	PQR-C44C7PLCL-KS,COMPONENT, Q-ROSA,100G CFP4 LR4,TELECOM&DATACOM,100G 25X4 ROSA,10KM,NSZ STD	\$152.20	1	EA	\$152.20
1000042374	SPECIALTY PRODUCTS, PCBA, CFP2-LR4 G2.PCBA+ With pre-installed firmware	\$174.50	1	EA	\$174.50

2. 100G CFP2 Transceiver Components Price Caps for 2019 and 2020 (v2)

FP2 Component Item	Component Item Description	Unit Total Cost	Usage	Unit	Total cost per module	Qty for 70pcs CFP2	PO amount for 70pcs CFP2
1000038861	GREASE,THERMALLY CONDUCTIVE GREASE,GAP FILLER 3500LV,CFP DCO	\$0.50	0.8	ml	\$0.40	0	\$0.0
1000039008	SPRING, WIRE DIA 0.2MM ,CFP2 MODULE	\$0.01	2	EA	\$0.03	200	\$2.5
1000027627	PAD,THERMAL PAD,100G-M, 1.0MM THICKNESS	\$11.46	0.067	EA	\$0.77	10	\$114.6
1000027777	GASKET, EMI GASKET FOR LC RECEPTACLE	\$0.07	2	EA	\$0.14	140	\$9.7
1000030380	COVER, FRONT COVER, FOR 520115064	\$0.84	1	EA	\$0.84	70	\$59.1
1000030386	INSERT, MODULE SLIDER, FOR 520115064	\$0.40	2	EA	\$0.79	140	\$55.6
1000030390	LATCH, FOR 520115064	\$0.43	1	EA	\$0.43	70	\$30.4
1000030391	SHRAPNEL, LC RECEPTACLE SHRAPNEL, FOR 520115064	\$0.19	2	EA	\$0.37	140	\$26.1
1000034469	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 9MM STAINLESS STEEL	\$0.03	4	EA	\$0.12	1000	\$30.2
1000034471	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 3MM STAINLESS STEEL	\$0.03	3	EA	\$0.08	1000	\$27.4
1000035064	SPACER, ISOLATION SPACER FOR DIE CASTING OF 536155065	\$0.25	1	EA	\$0.25	70	\$17.4
1000035452	BASE, MODULE BASE FOR DIE CASTING OF 536155065	\$4.72	1	EA	\$4.72	70	\$330.1
1000035453	LID, MODULE LID FOR DIE CASTING OF 536155065	\$4.47	1	EA	\$4.47	70	\$312.7
1000035459	SCREW, SOCKET HEAD CAP SCREW HEX DRIVE M1.6 X 5MM STAINLESS STEEL FOR DIE CASTING	\$0.03	2	EA	\$0.06	1000	\$28.0
1000035460	COVER, RF ABSORB COVER FOR 536155065	\$83.87	0.029	EA	\$2.43	2	\$167.7
301-8704-201	PLUG, 10G XFP-40KM(P1765F-81-2TD)RUBBER PLUG	\$0.06	1	EA	\$0.06	70	\$4.0
1000027621	LABEL, LATCH LABEL,LIGHT BLUE	\$0.01	1	EA	\$0.01	80	\$0.4
502-0705-001	SOLDER, M705 RMA98 SUPER P3 0.5MM	\$0.08	0.05	g	\$0.00	0	\$0.0
1000025547	LABEL, THE BLANK LABEL, WITH NEO LOGO, 38X15MM	\$0.03	1	EA	\$0.03	200	\$5.8
1000001761	LABEL, IMPLEMENTATION LABEL, ROLL	\$0.01	0.03	EA	\$0.00	1000	\$11.8

1000026612	PACKAGING BOX, PLASTIC TRAY FOR CFP2_LID	\$0.21	1	EA	\$0.21	162	\$33.9
1000026613	PACKAGING BOX, PLASTIC TRAY FOR CFP2_BASE	\$0.21	1	EA	\$0.21	162	\$33.9
1000026614	PACKING FOAM, CFP2 PACKING FOAM	\$0.02	2	EA	\$0.04	600	\$11.7
1000026615	BOX, CFP2 PACKING BOX	\$0.22	1	EA	\$0.22	100	\$21.9
350-0201-001	LABEL, TUV AUTHENTICATE LABEL	\$0.01	1	EA	\$0.01	500	\$2.6
1000037316	LABEL, UL LABEL, 64.5X14.5, LN50	\$0.02	1	EA	\$0.02	500	\$10.0
350-1210-001	LABEL, ROHS6 LABEL	\$0.01	1	EA	\$0.01	500	\$6.2
1000033093	LABEL, LASER LABEL, ENGLISH, 60X40	\$0.03	1	EA	\$0.03	1000	\$34.7
1000003543	LABEL,NEW ATTENTION LABEL	\$0.01	0.03	EA	\$0.00	2000	\$20.2
1000042371	OL3183M, COMPONENTS, 100G Q-TOSA, 100G CFP4 LR4, TELECOM&DATACOM, Q-TOSA, PQT-C44C3ELCL-KD, NSZ STD	\$303.35	1	EA	\$303.35	70	\$21,234.5
1000042372	PQR-C44C7PLCL-KS,COMPONENT, Q-ROSA,100G CFP4 LR4,TELECOM&DATACOM,100G 25X4 ROSA,10KM,NSZ STD	\$152.20	1	EA	\$152.20	70	\$10,654.0
1000042374	SPECIALTY PRODUCTS, PCBA, CFP2-LR4 G2.PCBA+ With pre-installed firmware	\$174.50	1	EA	\$174.50	70	\$12,215.0
1000042365	PT-C24C3LDCL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP DUAL-RATE G2, RUSSIA	\$989.69	1	EA	\$989.69	8	\$7,917.5
1000042366	PT-C24C3LECL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP SINGLE-RATE G2, RUSSIA	\$989.57	1	EA	\$989.57	9	\$8,906.1
CFP2 Total							\$62,335.8

3. AAWG Components Price Caps for 2019 and 2020

MANUFACTURING LICENSE AGREEMENT

MANUFACTURING LICENSE AGREEMENT ON FIBER-OPTIC NETWORK COMPONENTS

This **Agreement**, including appended **Exhibits**, is made and entered into as of the latest date indicated on the signatures page ("**Effective Date**"), by and between:

NEOPHOTONICS CORPORATION ("**NeoPhotonics**" or "**Licensor**"), a corporation duly organized and existing under the laws of Delaware and having its registered office at 2911 Zanker Road, San Jose, California 95134, USA; and

NEOPHOTONICS CORPORATION, LLC ("**NeoPhotonics, LLC**" or "**Licensee**"), located at Kaleidoscope Business Center, 56 Shodnenskaya Ulitsa, Moscow, Russia 125363,

each a "**Party**" and together the "**Parties**" to this Agreement.

WHEREAS, NeoPhotonics has hereinafter defined Intellectual Property supporting and enabling the manufacture of hereinafter defined Licensed Products; and

WHEREAS, NeoPhotonics has established a manufacturing facility at NeoPhotonics, LLC suitable for and capable of producing Licensed Products; and

WHEREAS, Licensee desires to receive Intellectual Property rights from NeoPhotonics to manufacture and sell Licensed Products for Licensee's own business;

NOW THEREFORE, in consideration of the mutual covenants and premises contained herein, the Parties hereto agree as follows:

ARTICLE 1. DEFINITIONS

For the purpose of this Agreement, the following terms shall have the respective meanings as set forth below:

1.1 "**Affiliate**" means any legal entity (such as a corporation, partnership, or limited liability company) that controls, is under common control with or is controlled by the party to which affiliation is claimed, for so long as such control exists. For the purposes of this definition, the term "control" means (a) beneficial ownership of at least fifty percent (50%) of the voting securities of a corporation or other business organization with voting securities, (b) a fifty percent (50%) or greater interest in the net assets or profits of a partnership or other business organization without voting securities or (c) the ability to direct the general business activities of a corporation, partnership or other business organization

1.2 "**Categorical Licensed Patents**" means all patents explicitly listed or described in Exhibit B of this Agreement.

1.3 "**Confidential Information**" means all information, inventions, trade secrets, know-how, and data disclosed by one Party ("**Disclosing Party**") to the other Party ("**Receiving Party**") pursuant to this Agreement, including information relating to licensed patents, research and development plans, experiments, results, trade secrets and manufacturing, marketing, financial, regulatory, personnel and other business information and plans, whether in oral, written, graphic or electronic form and whether in existence as of the Effective Date or developed or acquired in the future. Such information already provided to NeoPhotonics LLC by NeoPhotonics prior to the Effective Date should be treated by both Parties as Confidential Information of the other. Information of the following types shall not be considered Confidential Information: (a) is public knowledge at the time of disclosure by the Disclosing Party; (b) becomes public knowledge through no fault of the Receiving Party; (c) was in the possession of the Receiving Party at the time of disclosure by the Disclosing Party as evidenced by proper business records; (d) is disclosed to the Receiving Party by a Third Party as evidenced by proper business records, to the extent such Third Party's disclosure was not in violation of any obligation of confidentiality; or (e) is independently developed by the Receiving Party without use of or reference to the Disclosing Party's Confidential Information, as evidenced by contemporaneous written documentation.

1.4 "**Customer**" means any Third Party, to the extent such Third Party is a purchaser or recipient of Licensed Products and/or Licensed Processes for such Third Party's consumption and/or end use and/or resale and/or redistribution

1.5 "**Improvement**" means any refinements or enhancements to the information of the licensed patents, Confidential Information, or the Technical Information, partially or fully developed or conceived by either Party prior to the termination of this Agreement

1.6 "**Intellectual Property**" or "**IP**" means any intellectual property of the respective Party as indicated; including but not limited to national and regional patents, utility models designs, trade secrets, trademarks, trade names, works of authorship, copyrights, moral rights, and any derivatives thereof

1.7 "**Intellectual Property Rights**" or "**IPR**" means the legal rights attendant to the Intellectual Property.

1.8 "**Licensable IPR**" shall mean any and all Licensor's national and regional patents, utility models, design patents and application thereof relating to the manufacture, use, and sale of a corresponding Licensed Product that are: (a) applications having a first filing or priority date in any country on or prior to the Effective Date, all patents claiming priority to such applications, or any patents which eventually issue from such patent applications; and (b) which are owned by Licensor or a Licensor Affiliate and that Licensor has the right to grant Licensee the licenses set forth herein without any royalty payments to any third party.

1.9 "**Licensed Product**" means a product or product class mutually agreed to be covered by this license Agreement and duly described, including qualifying conditions and limitations and license-fee schedules, in Exhibit-A of this Agreement, or appended thereto by agreement approved and signed by both Parties.

1.10 "**Net Sales**" means the gross amount billed by Licensee or its sales designees for sales of Licensed Product, less the following: (a) customary trade, quantity, allowances or cash discounts to the extent actually allowed and taken; (b) amounts repaid or credited by reason of rejection, return, or retroactive price reductions; (c) all taxes and other governmental charges, and e-commerce transactional charges, levied on the sale, transportation, delivery, or use of such Licensed Products and Licensed Processes which are actually paid by or on behalf of Licensee; (d) transportation and shipping costs and costs of insurance in transit; (e) reasonable commissions paid to individuals who are independent contractors; and (f) reasonable cost of collections. For certainty, sale or other transfer of Licensed Products to Licensor or a Licensor Affiliate is not subject to royalties and does not contribute to Net Sales.

1.11 "**Qualifying Licensee Transfer**" means a transaction where the Licensee will acquire, be acquired by, or come under common control with a suitable commercial entity, including the entity FiberTrade Co. Ltd, occurring before December 31, 2019.

1.12 "**Rules**" has the meaning provided in Article 10.12.

1.13 "**Subsidiary**" means an Affiliate that is controlled by the respective Party to this Agreement and whose confidentiality obligations are at least of the same scope as provided in Article 5.

1.14 "**Technical Information**" means any and all technical information which is furnished or made available to Licensee by NeoPhotonics under this Agreement or any concurrent technical-services agreement, training agreement, or technology-transfer agreement between the Parties. Technical Information includes but is not limited to manufacturing technology documents, design technology documents, bills of materials, financial models, internal product specifications, process training, and other technology

ARTICLE 2. GRANT OF LICENSES

2.1 For Licensed Products. Subject to the terms and conditions as set forth in this Agreement, including all terms and conditions set forth for each corresponding Licensed Product, Licensor hereby grants to Licensee during the term of this Agreement a non-exclusive, perpetual, world-wide license, under the Technical Information and any relevant Licensable IPR, to develop, design, manufacture, use, sell, offer for sale, lease, export, and otherwise dispose of Licensed Products. Said license of this Article 2.1 is furthermore (a) sublicenseable solely as expressly set forth subsequently in this Article 2, (b) transferable and royalty and/or fee bearing solely according to the provisions set forth in Article 3 of this Agreement, and (c) revocable solely according to the termination provisions set forth in Article 7 of this Agreement. All the Licensed Products sold by Licensee under the license set forth above shall display such marks representing and denoting unambiguously that Licensee is the manufacturer of such Licensed Product.

2.2 For Additional Purposes. Subject to the terms and conditions as set forth in this Agreement, Licensor hereby grants to Licensee during the term of this Agreement a non-exclusive, perpetual, fully-paid-up and royalty-free, world-wide license under the Categorical Licensed Patents to develop, design, manufacture, use, sell, offer for sale, lease, export, and otherwise dispose of any products or services of the Licensee. Said license of this Article 2.2 is furthermore (a) sublicenseable solely as set forth subsequently in this Article 2, (b) transferable solely according to the transfer provisions set forth in Article 3 of this Agreement, and (c) revocable solely according to the termination provisions set forth in Article 7 of this Agreement.

2.3 Exceptions. Isolated elements of Licensor's IPR may be "essential claims" to the practice of a community-accepted product standard or multi-source agreement ("MSA"), wherein Licensor has an obligation to license the essential claims under (fair) reasonable and non-discriminatory ("(F)RAND") terms to anyone desiring to practice, and willing to agree to the terms and conditions of, the standard or MSA. In such cases, the licenses granted herein will not apply and Licensee may need to request a separate license from Licensor to practice that standard or MSA. When so requested, Licensor agrees to provide Licensee with the appropriate (F)RAND license at least as favorable as the most favorable terms provided any third-party licensee of the same essential claims.

2.4 Sublicense to Subsidiaries. Notwithstanding the foregoing, the licenses granted herein shall include the right of Licensee to sublicense the rights granted under Article 2.1 or Article 2.2 to its Subsidiaries and disclose to any such sublicensed Subsidiary only that portion the Technical Information that is essential for the sublicensed activity. Licensee shall be fully responsible to Licensor with respect to any act or omission or breach of the terms of this Agreement by such Subsidiaries. Any sublicense granted to the Subsidiary shall terminate on the date such Subsidiary ceases to be a Subsidiary. A sublicensed Subsidiary may not further sublicense its rights under this Agreement.

2.5 Continued use of Technical Information. On or after the expiration of the term of this Agreement in accordance with Article 7.1, the licenses granted to Licensee by Licensor under Article 2.1 and 2.2 shall continue without any additional payment to Licensor, provided that Licensee shall maintain the Technical Information in confidence in accordance with Article 5.

2.6 Trademarks and Tradenames. Unless within the conditions of an approved waiver signed by NeoPhotonics, Licensee may not use any NeoPhotonics registered trademark, any NeoPhotonics common-use trademark in use prior to the Effective Date, or any NeoPhotonics common-use trademark with established use prior to any public use by Licensee.

2.7 No implied licenses. Nothing contained in this Agreement shall be construed as granting by implication, estoppel or otherwise, upon any party licensed hereunder, any license of other right under any patent, utility model, copyright, mask work right, trade secret or the like, except the licenses and rights expressly granted hereunder.

ARTICLE 3 LICENSE PROVISIONS

3.1 Transferable. This Agreement will be transferable by Licensee to a third party as successor Licensee only with explicit written consent of Licensor. Licensor shall not unreasonably withhold or delay such consent. NeoPhotonics commits that for one (but not more than one) Qualifying Licensee Transfer, it shall approve the assignment of rights under this Agreement to that first successor Licensee without material changes. It should be anticipated that subsequent transfer requests with NeoPhotonics as Licensor and a NeoPhotonics competitor as new Licensee would be denied or be granted with significant conditions and/or modifications.

3.2 Fees and Royalties. There are no fees or royalties for the rights granted to the Categorical Licensed Patents. As of the Effective Date, for the license rights granted for Licensed Products, the license fee is zero US Dollars (\$0) and the royalty rate is zero per-cent (0%). The fee and royalty rate cannot be changed except by mutual written agreement of the Parties. Future transfers of this Agreement to a new Licensee, beyond the first expected transfer, may require agreeing to a greater fee and/or royalty rate for Licensed Products. Regardless of whether there are fees or royalties due, reporting sales of Licensed Products is required per Article 3.3 .

3.3 Reporting. Within 45 days after each end of Licensee's fiscal quarter, Licensee shall provide Licensor with a confidential detailed reporting for sales of Licensed Product during that quarter, and for any other significant commercial activities having benefit of the licenses herein. Such reports should include at least for each Licensed Product: a list of customers; number of units sold to each customer; and the average selling price during the quarter.

ARTICLE 4. PROPRIETARY RIGHTS

This Agreement does not provide or specify any change in the ownership of any Intellectual Property or Technical Information. All ownership of, and title to NeoPhotonics Intellectual Property and Technical Information shall remain with NeoPhotonics and NeoPhotonics shall retain the rights for itself and its Affiliates to utilize or furnish to others the Technical Information in any way whatsoever and in any countries of the world.

ARTICLE 5. CONFIDENTIAL TREATMENT

Treatment of Confidential Information is primarily governed by the confidentiality agreement between the Parties having an effective date of 30-SEP-2018, and by any subsequently valid confidentiality agreement between the Parties. If any valid confidentiality agreements between the Parties expire prior to the termination of this Agreement, Parties will continue during the Term of this Agreement to protect the Confidential Information relevant to the purposes of this Agreement with at least the same degree of care specified in the most-recently valid confidentiality agreement. Furthermore, Confidential Information provided for the purposes of this Agreement shall be additionally subject to the following terms:

5.1 Licensee agrees not to disclose the Confidential Information to any third party whether an individual, corporation, or other entity without the prior written consent of NeoPhotonics and will limit its disclosure to its employees having a need to know such Confidential Information for the purpose herein. Licensee shall not use the Confidential Information for any purpose other than those contemplated by this Agreement. Licensee shall use the same degree of care as it uses to protect its own confidential information, but no less than reasonable care, to prevent the unauthorized use, dissemination or publication of the Confidential Information.

5.2 The obligation herein shall not apply to any information which: (a) was generally available to the public before disclosure to Receiving Party; (b) becomes generally available to the public other than by a breach of this Agreement by Receiving Party; (c) is rightfully received by Receiving Party from a third party without confidential limitations; (d) is independently developed by or for Receiving Party by individuals who have not received directly or indirectly the Confidential Information disclosed under this Agreement; (e) was known to Receiving Party prior to the receipt of same from Disclosing Party; or (f) is hereafter publically disclosed by Disclosing Party. The obligations contained in this Article 5 shall survive any termination of this Agreement or any rights granted hereunder.

5.3 Notwithstanding the foregoing, Licensee may disclose the Technical Information to its Subsidiaries to whom Licensor granted sublicense rights pursuant to Article 2.4 for the purpose and to the extent provided for in Article 2.4; provided that Licensee shall ensure that such Technical Information is used for the sole purpose expressly provided in Article 2, and that it is not used for any other purposes. Furthermore, Licensee shall be fully responsible for the compliance by such Subsidiaries with the terms and conditions of this Agreement, including, but not limited to the confidentiality obligations contained in this Article 5.

ARTICLE 6. REPRESENTATIONS, COVENANTS AND DISCLAIMERS

6.1 Each Party represents that it is (a) a corporation duly organized, validly existing, and in good standing under the laws of the state or territory in which it is incorporated, (b) has full corporate power and authority and the legal right to own and operate its property and assets and to carry on business as it is now being conducted and as contemplated in this Agreement, and (c) has the full corporate power and authority and the legal right to enter into this Agreement and perform its obligations hereunder.

6.2 NeoPhotonics represents that it or its Affiliate is the owner and/or assignee of all rights, title, and interest to and in the Technical Information and the NeoPhotonics Intellectual Property Rights therein and that it has the right to grant Licensee the rights and licenses granted in this Agreement

6.3 If NeoPhotonics transfers its interest in any of the Technical Information or Intellectual Property Rights to a third party, NeoPhotonics shall ensure that the rights granted to Licensee in this Agreement shall remain effectively whole.

6.4 NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN THIS AGREEMENT, THE FOREGOING IS IN LIEU OF ALL WARRANTIES, EXPRESS OR IMPLIED, WHETHER ARISING BY LAW, CUSTOM, OR CONDUCT. NeoPhotonics has no responsibility of any kind for the correctness of any Technical Information (other than reasonable care in its preparation and furnishing) or the ability of Licensee to utilize the Technical Information for any products made by Licensee to meet any functional specifications or any particular purpose of merchantability. NeoPhotonics makes no representation or warrants that any products, including but not limited to the Licensed Products, manufactured utilizing the NeoPhotonics Technical Information or the NeoPhotonics Intellectual Property Rights therein licensed under this Agreement, will not infringe any patents or utility models or other IPR of any third parties. NeoPhotonics shall in no event be liable for any claim or demand against Licensee or any related party by any other party arising out of or resulting from the Technical Information provided or made available to Licensee pursuant to this Agreement and/or NeoPhotonics Intellectual Property Rights therein licensed, including, but not limited to any claims or actions based on any actual or alleged infringement of any patents, trademarks, utility models, design patents, copyrights, mask works, trade secrets, or other intellectual property rights owned or controlled by any third party. LICENSEE ASSUMES SOLE AND COMPLETE RESPONSIBILITY FOR ANY AND ALL USE OF THE TECHNICAL INFORMATION FURNISHED OR MADE AVAILABLE TO LICENSEE BY NEOPHOTONICS HEREUNDER AND THE RESULTS THEREOF, AND ANY AND ALL THE LICENSED PRODUCTS MANUFACTURED AND/OR SOLD BY OR FOR LICENSEE.

6.5 TO THE MAXIMUM EXTENT PERMITTED BY LAW, IN NO EVENT SHALL NEOPHOTONICS BE LIABLE TO LICENSEE OR ANY THIRD PARTY FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, OR ANY OTHER DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS

INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OR INABILITY TO USE THE TECHNICAL INFORMATION, WHETHER OR NOT THE POSSIBILITY OR CAUSE OF SUCH DAMAGES WAS KNOWN TO NEOPHOTONICS.

ARTICLE 7. TERM AND TERMINATION

7.1 This Agreement shall commence on the Effective Date. Unless otherwise terminated for cause or mutual agreement according to subsequent paragraphs of this Article 7, this Agreement shall continue in full force so long as there are unexpired patents in either the Licensable IPR or the Categorical Licensed Patents. The license grants of this Agreement shall survive ordinary termination under this Article 7.1 according to Article 2.5.

7.2 If either Party shall fail, refuse or neglect to fully and faithfully keep, observe or perform any covenant contained in this Agreement to be kept, observed or performed by such Party, then the other Party may give notice to the breaching Party in writing of such breach, stating in such notice the covenant or covenants of this Agreement which the breaching Party shall have failed, refused or neglected to keep, observe, or perform, and if the breaching Party shall, for a period of sixty (60) days after such notice is given, continue to fail, refuse or neglect to keep, observe or perform any such covenants, then the other Party may terminate this Agreement, by serving upon the other Party notice of termination; but such act shall not prejudice the right of the terminating Party to recover any sum due or owing at the time of termination or any damages or costs incurred due to the non-compliance or non-performance by the other Party.

7.3 Licensor may terminate this Agreement or require the renegotiation of this Agreement under threat of termination if Licensee acquires a direct competitor of NeoPhotonics that has manufacturing facilities outside the Russian Federation.

7.4 Either Party may terminate this Agreement immediately upon giving notice in the event of one or more of the following; (a) appointment of a trustee or receiver for all or any part of the assets of the other Party; (b) insolvency or bankruptcy of the other Party; (c) attachment of all or a substantial part of the assets of the other Party; (d) expropriation of the business assets of the other Party; (e) nationalization of the other Party; or (f) dissolution or liquidation of the other Party. If either Party becomes involved in any of events enumerated in (a) through (f), such Party shall give the other prompt notice.

7.5 In the event of termination of this Agreement by Licensor pursuant to Articles 7.2 through 7.4:

- (I). Licensee shall, at its own expense, return all Technical Information documents received under this Agreement and all copies thereof, and all materials embodying or derived from the Technical Information;
- (II). Licensee shall promptly discontinue the manufacture of the Licensed Product and shall discontinue the sale thereof, except that after termination of this Agreement by Licensor pursuant to Article 7.4 Licensee may (a) sell, lease or dispose of Licensed Products that were in inventory or are manufactured from work in process that existed at the time of termination, (b) perform after termination contractual obligations that existed at the time of termination and (c) repair, replace and otherwise support Licensed Products in the ordinary course of business after termination;
- (III). Licensee shall make payment of all due license fees and royalties that have not been paid at the time of termination; and
- (IV). Licensor shall, in no event, be required to refund any license fees or royalties already paid by Licensee at the time of termination.

7.6 Termination for convenience. Parties may terminate this agreement at any time by written mutual agreement, and according to any terms, conditions, or activities specified in such agreement. Each Party shall give reasonable and fair consideration to a mutual-termination request presented by the other Party.

7.7 Survival: Notwithstanding any contrary provisions herein, the provisions of all of Article 1, Articles 2.3, 2.5, 2.6, and 2.7, and all of Articles 4, 5, 6, 9, and 10 shall survive termination of this Agreement for any reason. In addition, the "perpetual" qualifier of the licenses granted in Articles 2.1 and 2.2 ensures that articles made, acquired, and/or sold under valid license, and services provided under valid license, shall remain licensed after termination of this Agreement. All other license rights granted in Articles 2.1 and 2.2 shall be revoked upon termination.

ARTICLE 8. PAYMENTS

8.1 All payments due Licensor pursuant to this Agreement shall be made to the following bank account via wire transfer without deductions or charges of any kind:

[No royalty or fee payments are expected to be due hereunder as of the Effective Date.]

8.2 Licensee shall pay Licensor interest on any and all amounts overdue at a rate and schedule to be determined in accord with any mutual agreement to a non-zero royalty and/or fee structure. Licensee will be additionally liable to Licensor for all costs of collecting past due amounts, including reasonable attorney's fees and costs.

ARTICLE 9. SUPPLY OF PARTS AND/OR COMPONENTS

Licensee may purchase NeoPhotonics-proprietary parts and/or components for the Licensed Products, excluding required NeoPhotonics content of the Licensed Product, from NeoPhotonics suppliers. NeoPhotonics will not prohibit nor hamper Licensee's procurement of

said parts and/or components from the suppliers so far as such parts and/or components are utilized for Licensed Products. Notwithstanding the foregoing, NeoPhotonics shall in no event be liable to Licensee or any other party for supply of such parts and/or components by such suppliers for any reason.

ARTICLE 10. MISCELLANEOUS PROVISIONS

10.1 Exhibits: All exhibits and schedules annexed hereto are expressly made part of this Agreement as though fully set forth herein, including:

- (I). Exhibit A, and any mutually-approved supplements thereto, shall describe all Licensed Products or Licensed Product categories.
- (II). Exhibit B shall list the Categorical Licensed Patents

10.2 Assignment: Neither Party will assign or transfer this Agreement, or any rights or obligations under this Agreement, without the prior written consent of the other Party (which consent shall not be unreasonably conditioned, delayed or withheld), except that Licensor may, with prior notice to the Licensee but without Licensee’s consent, assign or transfer this Agreement with all its rights and obligations hereunder to a successor of all or substantially all Licensor’s assets, stock or business to which this Agreement relates, whether by sale, acquisition, merger, operation of law or otherwise. For certainty of intent, Licensee may not assign this Agreement to a successor without explicit written consent, whether conditional or unconditional, from Licensor.

10.3 Independent Contractors: The Parties are independent contractors. This Agreement does not create and shall not be considered to create the relationship of principal-and-agent or master-and-servant or a partnership between the Parties. Neither Party shall be liable in any way to any third party for any engagement, obligation, contract, representation, or transaction or for any negligent act or omission to act on the part of the other Party.

10.4 Severability: If any provision of this Agreement is held by a court of law to be illegal, invalid or unenforceable, (a) that provision shall be deemed amended, if possible, to achieve as nearly as possible the same economic effect as the original provision consistent with the Parties’ intent when entering into this Agreement, and (b) the legality, validity and enforceability of the remaining provisions of this Agreement shall not be affected or impaired thereby.

10.5 Confidential Agreement: Each Party shall keep the terms of this Agreement confidential and shall not now or hereafter divulge the terms of this Agreement or any part thereof to any third party except according to any of: (a) with prior written consent of the other Party; (b) to any governmental body having jurisdiction to call therefor; (c) as otherwise may be required by law; or (d) to legal counsel and auditors representing either Party.

10.6 Modification and Amendment: This Agreement and its provisions may be modified, amended, or waived only by additional written mutual agreement specifying such modifications, amendments, or waivers executed by both parties

10.7 No Waiver: Any failure of either Party to enforce, at any time and for any period of time, any of the provisions of this Agreement shall not be construed as a waiver of such provisions or of the right of the Party thereafter to enforce each and every such provision.

10.8 Export: The obligations of NeoPhotonics to export the Technical Information and rights granted therein shall at all times be subject to such restrictions and limitations as may be imposed upon NeoPhotonics by the laws, regulations, and other administrative acts, now or hereafter in effect, of the US Government and any departments and agencies thereof. Licensee shall not export, directly or indirectly the Licensed Products or the Technical Information to any country or person for which the receipt of such products or information requires an export license or other government approval, without first obtaining such license or approval.

10.9 Notice and Communication: Any notice required or permitted to be given under this Agreement shall be in written English and shall be delivered by hand or mailed by registered mail, or sent by facsimile or e-mail with a confirmation copy sent within three (3) days thereafter by another method of notification specified herein, to the corresponding address set forth below:

To NeoPhotonics:
NeoPhotonics Corporation
2911 Zanker Road
San Jose, California, 95134 USA

To Licensee:

10.10 Force Majeure: Neither Party will be responsible for delays resulting from causes beyond the reasonable control of such Party, including fire, explosion, flood, war, strike, or riot, provided that the nonperforming Party uses commercially reasonable efforts to avoid or remove such causes of nonperformance and continues performance under this Agreement with reasonable dispatch whenever such causes are removed.

10.11 Construction: As used in this Agreement, (a) neutral pronouns and any derivations thereof shall be deemed to include the feminine and masculine and all terms used in the singular shall be deemed to include the plural and vice versa, as the context may require; (b) the words “hereof” and “hereunder” and other words of similar import refer to this Agreement as a whole, including all exhibits and schedules as the same may be from time to time amended or supplemented and not to any subdivision of this Agreement; (c) the word “including” is not intended to be exclusive and means “including without limitation”; and (d) descriptive headings are

inserted for convenience of reference only and do not constitute a part of and shall not be utilized in interpreting this Agreement. This Agreement shall be fairly interpreted in accordance with its terms and without any strict construction in favor of or against either party.

10.12 Governing Law and Jurisdiction: This Agreement shall be governed by and construed in accordance with the laws of Delaware, USA without regards to its principles of conflicts of law. The United Nations Convention on Contracts for the International Sale of Goods is specifically disclaimed. This Agreement and any disputes or claims arising out of or in connection with its subject matter or formation (including any contractual or non-contractual obligation, dispute, controversy or claim arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination on-contractual disputes or claims), including any question regarding its existence, validity or termination will be referred to and finally resolved by Arbitration Institute of the Stockholm Chamber of Commerce under Arbitration Rules of the Arbitration Institute of the Stockholm Chamber of Commerce (the "**Rules**"). The place of arbitration shall be Stockholm. The arbitration shall be in English. There shall be 3 arbitrators appointed in accordance with the Rules.

10.13 Entirety: This Agreement, including annexed exhibits and schedules, sets forth the entire agreement and understanding between the parties as to the subject matter hereof, and supersedes all prior or contemporaneous agreements, proposals and negotiations, whether oral, written and concerning such subject matter. This Agreement imposes no obligation on, and constitutes no offer by, either Party to purchase, sell, license or transfer or otherwise dispose of any technology, intellectual property, services, or products, or to enter into any business relationship other than that set expressly forth in writing in this Agreement

10.14 Compliance: In performance of this Agreement, both Parties agree to comply with all applicable laws and governmental rules and regulations. Both Parties hereby acknowledge that they are not expected or authorized to take any action in the name of or on behalf of the other which would violate any such laws, rules, or regulations.

The Parties have executed this Agreement as of the latest date set forth below:

NEOPHOTONICS CORPORATION

By: _____

Name: ____
(print)

Title: ____

Address:

Date: ____

LICENSEE

By: ____

Name: ____
(print)

Title: ____

Address:

Date: ____

EXHIBIT A
LICENSED PRODUCTS

Licensed Product #1
CFP2-LR4

Description: CFP2 100G 4x25 LAN-WDM Transceiver

Required to use: NeoPhotonics ROSA and TOSA

Customers: Any

Licensed Versions: NeoPhotonics design provided per contracts during Technical Services Support for the initial production of Deliverables, and minor revisions thereof.

Exceeds License: Any product having different form-factor, higher data rate, functionally-different or incompatible operational characteristics, or major re-design will not be Licensed Product.

Royalty Schedule:

All Sales 0%

Licensed Product #2
AAWG

Description: Athermal AAWG, 100GHz or 50GHz channel spacing, various # channels

Required to use: NeoPhotonics AAWG engine

Customers: Any

Licensed Versions: NeoPhotonics design provided per contracts during Technical Services Support for the initial production of Deliverables.

Exceeds License: Any product having: different form-factor; functionally-different or incompatible operational characteristics; or major re-design will not be Licensed Product.

Royalty Schedule:

All Sales 0%

Licensed Product #3
SPLITTERS

Description: Standard power splitters, channel counts vary

Required to use: NeoPhotonics PLC splitter chips

Customers: Any

Licensed Versions: Products complying with any splitter-product designs provided by NeoPhotonics, and minor revisions thereof.

Exceeds License: Any product having: different form-factor; functionally-different or incompatible operational characteristics; or major re-design will not be Licensed Product.

Royalty Schedule:

All Sales 0%

EXHIBIT B
CATEGORICAL LICENSED PATENTS

The patents listed in the following table are the Categorical Licensed Patents of this Agreement as of the date of execution. Although Licensor believes this list to be complete, the list shall further include any other patents or applications owned by Licensor that claim priority to the listed patents or applications, or any patents which eventually issue therefrom. Licensor does not herein assume any obligation to maintain or further pursue the validity of these patents. Licensor does not represent that it does not or will not grant similar rights under these patents to other parties. Licensor does covenant that it will use reasonable best efforts to ensure that any transfer of ownership or control of any valid patents or applications of this list will include transfer of the corresponding rights granted to Licensee herein.

Family	CC	Pat/App.	Expiration	Title
A007	US	6,671,450	22-Mar-21	APPARATUS AND METHOD TO METALLIZE, REINFORCE, AND HERMETICALLY SEAL MULTIPLE OPTICAL FIBERS
A010	US	6,498,882	28-Nov-20	ASSEMBLY AND METHOD FOR REORGANIZING PLANAR LIGHTWAVE CIRCUIT CHANNELS
A018	US	6,618,514	11-Oct-21	PASSIVE PIGTAIL ATTACHMENT FOR PLANAR LIGHTWAVE CIRCUITS
	US	6,603,892	24-Oct-21	
	CN	2821167.7	29-Sep-22	
	DE	60206188.1	30-Sep-22	

A071	DK	EP1438612	30-Sep-22	MECHANICAL BEAM STEERING FOR OPTICAL INTEGRATED CIRCUITS
	FR	EP1438612	30-Sep-22	
	GB	EP1438612	30-Sep-22	
	IT	EP1438612	30-Sep-22	
	JP	4719417	30-Sep-22	
	KR	10-0696228	30-Sep-22	
	SE	EP1438612	30-Sep-22	
A084	US	6,787,868	20-Jan-22	MICROLENSSES FOR INTEGRATED OPTICAL DEVICES
A289	US	6,975,793	07-Nov-22	METHOD AND APPARATUS FACILITATING MECHANICAL BEAM STEERING FOR OPTICAL INTEGRATED CIRCUITS
	US	7,539,364	17-May-23	
A293	US	6,738,545	07-Oct-22	ATHERMAL AWG AND AWG WITH LOW POWER CONSUMPTION USING GROOVE OF CHANGEABLE WIDTH
	CN	200480043452.2	03-May-24	
	EP	EP04775948.5		
	HK	HK1110396	05-May-24	
	JP	4688869	05-May-24	
	KR	10-0795736	05-May-24	
	US	7,062,127	07-Oct-22	
A330	US	7,272,273	21-Jan-25	PHOTODETECTOR COUPLED TO A PLANAR WAVEGUIDE
	US	7,574,084	21-Jan-25	
A334	US	7,587,138	15-Nov-27	BROADBAND 2X2 OPTICAL SPLITTER
	CN	200780009997.5	22-Feb-27	
	EP	7757435.8		
	JP	5135234	23-Feb-27	
	KR	10-1347510	23-Feb-27	
	US	8,442,369	16-Dec-28	
	F0003	US	9,544,668	
CN		201180067424.4	29-Nov-31	
EP		11848405.4		
IN		4023/CHENP/2013		
JP		6117110	30-Nov-31	
KR		10-2013-7018377		
RU		2564100	30-Nov-31	
F0009	US	9,391,695	28-Aug-34	OPTICAL NETWORK COMMUNICATION SYSTEM WITH EMBEDDED OPTICAL TIME DOMAIN REFLECTOMETER AND METHOD OF OPERATION THEREOF
OPTNT01	US	7,492,992	08-Aug-23	BI-DIRECTIONAL PLC TRANSCEIVER DEVICE
NG0005	KR	10-0890981	26-Oct-21	MULTILAYERED OPTICAL STRUCTURES
	US	9,939,579	16-Dec-25	
NG0006	US	7,164,818	03-May-22	INTEGRATED GRADIENT INDEX LENSES
	US	7,391,940	03-May-22	
NG0007	US	7,224,882	20-Nov-22	OPTICAL MATERIALS WITH SELECTED INDEX OF REFRACTION
	US	7,437,047	17-Jan-22	
NG0008	TW	198300	30-Oct-18	PHOSPHORS
	US	7,423,512	04-Jul-22	
NG0013	US	6,193,936	09-Nov-18	REACTANT DELIVERY APPARATUSES
	JP	4524410	08-Nov-19	

	US	6,508,855	03-Jan-21	
NG0015	US	6,482,374	16-Jun-19	METHODS FOR PRODUCING LITHIUM METAL OXIDE PARTICLES
	US	7,323,158	09-Nov-18	
NG0019	US	6,749,648	19-Jun-20	LITHIUM METAL OXIDES
	JP	5286582	14-Jun-21	
	KR	100816116	15-Feb-23	
NG0021	US	6,692,660	27-Jun-21	HIGH LUMINESCENCE PHOSPHOR PARTICLES AND RELATED PARTICLE COMPOSITIONS
NG0035	US	6,890,624	25-Apr-20	SELF-ASSEMBLED STRUCTURES
NG0037	US	6,788,866	11-Feb-22	LAYER MATERIALS AND PLANAR OPTICAL DEVICES
NG0050	US	6,849,334	26-Jun-22	OPTICAL MATERIALS AND OPTICAL DEVICES
	CN	2820384.4	14-Aug-22	
	JP	5401000	15-Aug-22	
	KR	100930557	15-Aug-22	
	TW	I318693	15-Aug-22	
	US	7,306,845	15-Mar-22	
	CN	200610136169.5	14-Aug-22	
US	7,776,406	15-Mar-22		
NG0052	US	6,723,435	28-Aug-22	OPTICAL FIBER PREFORMS
	US	7,905,114	28-Aug-22	
NG0054	US	6,952,504	18-Apr-22	THREE DIMENSIONAL ENGINEERING OF PLANAR OPTICAL STRUCTURES
	TW	I266090	12-Dec-22	
	US	8,673,407	11-Apr-27	
NG0064	US	8,865,271	03-Mar-28	HIGH RATE DEPOSITION FOR THE FORMATION OF HIGH QUALITY OPTICAL COATINGS
	EP	4753377.3		
	KR	1276391	27-May-24	

SCHEDULE 5

NOTARIZED SPA

SALE AND PURCHASE AGREEMENT FOR A PARTICIPATORY INTEREST IN THE CHARTER CAPITAL OF A LIMITED LIABILITY COMPANY

ДОГОВОР КУПИ-ПРОДАЖИ ДОЛИ В УСТАВНОМ КАПИТАЛЕ ОБЩЕСТВА С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ

THIS PARTICIPATORY INTEREST SALE AND PURCHASE AGREEMENT (the "Agreement") is made on [●], in the City of Moscow

НАСТОЯЩИЙ ДОГОВОР КУПИ-ПРОДАЖИ ДОЛИ В УСТАВНОМ КАПИТАЛЕ («Договор») заключен [●] года в городе Москва.

BETWEEN

Между

[●], a company organized and existing under the laws of [●], with its registered address at [●], represented by _____, passport _____, residing at _____, acting on the basis of _____ (the "Seller"),

[●], компанией, учрежденной и осуществляющей деятельность по законодательству [●], с местом нахождения по адресу по адресу: [●], в лице _____ («Продавец»),

[●], incorporated and existing under the laws of [●], registration No. [●], with its registered address at [●], represented by _____, passport _____, residing at _____, acting on the basis of _____ (the "Purchaser 1"), and

[●], компанией, учрежденной и осуществляющей деятельность по законодательству [●], с местом нахождения по адресу: [●], в лице _____ («Покупатель 1»), и

[●], incorporated and existing under the laws of [●], registration No. [●], with its registered address at [●], represented by _____, passport _____, residing at _____, acting on the basis of _____ (the "Purchaser 2").

[●], компанией, учрежденной и осуществляющей деятельность по законодательству [●], с местом нахождения по адресу: [●], в лице _____ («Покупатель 2»).

WHEREAS, the Seller owns a participatory interest representing 100% of the charter capital of the Company (as defined below);

ПРИНИМАЯ ВО ВНИМАНИЕ, что Продавец является собственником доли, составляющей 100% уставного капитала Общества (как определено ниже);

NOW, THEREFORE, the Purchasers and the Seller (collectively – the "Parties", and each individually, a "Party") have agreed as follows:

С УЧЕТОМ ВЫШЕИЗЛОЖЕННОГО, Покупатели и Продавец (совместно именуемые «Стороны», а по отдельности – «Сторона») договорились о нижеследующем:

1. DEFINITIONS AND INTERPRETATION

1. ПОНЯТИЯ И ТОЛКОВАНИЕ

In addition to the terms defined above, the following terms shall have the following meanings, except where the context expressly provides otherwise:

Следующие термины имеют следующие значения, за исключением случаев, когда из контекста прямо следует иное:

Company means [●], incorporated and existing under the laws of the Russian Federation, registered on [●] with the Inspectorate of the Ministry for tax and levies of the Russian Federation in the city of [●] with the unified state registration number [●], TIN [●], KPP [●], with its registered address at [●];

Общество означает [●], учрежденное и действующее в соответствии с законодательством Российской Федерации, зарегистрированное [●] года Инспекцией Министерства Российской Федерации по налогам и сборам по [●] за основным государственным регистрационным номером [●], ИНН [●], КПП [●], расположенное по адресу: [●];

Completion Date means the date of this Agreement;

Дата закрытия означает дату настоящего Договора;

FAS means the Federal Antimonopoly Service of the Russian Federation;

ФАС означает Федеральную антимонопольную службу Российской Федерации;

LLC Law means Federal Law of the Russian Federation No. 14-FZ "On Limited Liability Companies," dated February 8, 1998 (as amended);

Закон об ООО означает Федеральный закон «Об обществах с ограниченной ответственностью» № 14-ФЗ от 08.02.1998 (с последующими изменениями);

Notary has the meaning specified in Clause 4.1 of this Agreement;

Нотариус имеет значение, предусмотренное в пункте 4.1 настоящего Договора;

Purchase Price means USD 3,000,000;

Покупная цена означает 3.000.000 Долларов США;

Покупная цена 1 означает 2.970.000 Долларов США;

Purchase Price 1 means USD 2,970,000;

Покупная цена 2 означает 30.000 Долларов США;

Purchase Price 2 means USD 30,000;

Participatory Interest 1 means a participatory interest representing 99% of the charter capital of the Company with a nominal value of RUB 9,716,718.33 owned by the Seller;

Приобретаемая доля 1 означает долю, составляющую 99% уставного капитала Общества, номинальной стоимостью 9.716.718,33 рублей, принадлежащую на праве собственности Продавцу;

Приобретаемая доля 2 означает долю, составляющую 1% уставного капитала Общества, номинальной стоимостью 98.148,67 рублей, принадлежащую на праве собственности Продавцу;

Participatory Interest 2 means a participatory interest representing 1% of the charter capital of the Company with a nominal value of RUB 98,148.67 owned by the Seller;

In this Agreement, a reference to any clause shall be construed as a reference to a clause of this Agreement.

Ссылки на любые пункты Договора являются ссылками на соответствующие пункты настоящего Договора.

2. SALE OF THE PARTICIPATORY INTEREST

2. Продажа доли в уставном капитале

2.1 The Seller shall transfer

2.1 Продавец обязуется передать в собственность

(a) the Participatory Interest 1 to Purchaser 1, together with all rights attached thereto, and Purchaser 1 shall purchase and accept the Participatory Interest 1 from the Seller for the Purchase Price 1,

(a) Покупателя 1 Приобретаемую долю 1 (включая все связанные с ней права), а Покупатель 1 обязуется купить и принять у Продавца Приобретаемую долю 1 за Покупную цену 1, и

(b) the Participatory Interest 2 to Purchaser 2, together with all rights attached thereto, and Purchaser 2 shall purchase and accept the Participatory Interest 2 from the Seller for the Purchase Price 2,

(b) Покупателя 2 Приобретаемую долю 2 (включая все связанные с ней права), а Покупатель 2 обязуется купить и принять у Продавца Приобретаемую долю 2 за Покупную цену 2,

all in accordance with the terms and conditions of this Agreement.

всё вышперечисленное осуществляется в соответствии с условиями настоящего Договора.

2.2 The rights of the Seller to the Participatory Interest were granted to the Seller by [Minutes of the Extraordinary General Meeting of the Participants of the Company No. [●] and are confirmed by the Extract from the Unified State Register of Legal Entities with respect to the Company dated [_____] No. _____], and [payment order issued by the Seller on [●] to pay the contribution to the charter capital of the Company], all confirming that the Participatory Interest was fully paid for.

2.2 Права Продавца на Приобретаемую долю принадлежат Продавцу на основании [Протокола внеочередного общего собрания участников Общества № [●] от [●] года] и подтверждаются Выпиской из Единого государственного реестра юридических лиц в отношении Общества от [_____] года за № [_____] , а также платежным поручением Продавца [от [●] года об оплате вклада в уставный капитал Общества], подтверждающими, что Приобретаемая доля в уставном капитале Общества полностью оплачена.

2.3 The Seller represents and warrants to the Purchasers that: (i) the Seller is the sole owner of the Participatory Interest; (ii) the Participatory Interest is free from any encumbrance, has not been sold, is not subject to any pending investigation or court proceeding; and that (iii) the execution of this Agreement and the performance by the Seller of any of its obligations hereunder do not and will not violate or conflict with any provisions of applicable laws, constitutional documents, statutory or contractual obligations of the Seller.

2.3 Продавец дает Покупателям заверения об обстоятельствах, что (1) Продавец является единственным собственником Приобретаемой доли; (2) Приобретаемая доля не обременена, не была продана, не является предметом незавершенного расследования или судебного разбирательства; и что (3) заключение настоящего Договора и исполнения Продавцом своих обязательств по нему не нарушают и не будут нарушать или не противоречат с какими-либо положениями применимого законодательства, учредительных документов, законных и договорных обязательств Продавца.

2.4 The Purchasers have obtained the approval of FAS to enter into and perform this Agreement.

2.5 Each of the Seller and the Purchasers has obtained necessary corporate approvals to authorize the execution of the Agreement and performance by it of its obligations under the Agreement, including, without limitation, obtaining the approval of the boards of directors of the Purchasers (Minutes w/n of [●] and Minutes w/n of [●]) and the board of directors of the Seller (Minutes w/n of [●]; Resolution of the Seller w/n of [●]).

3. Purchase Price and Payment Procedure

3.1 Purchaser 1 shall pay the entire purchase price to the Seller in accordance with the terms of a separate agreement entered into by the Purchasers and the Seller.

4. Transfer of the Participatory Interest

4.1 On the date hereof, the Seller and the Purchasers shall execute this Agreement and provide for its notarial certification by notary of the city of Moscow, [●] (the "Notary"), at his office at [●].

4.2 The Purchasers exercises the rights and bears the obligations of participants of the Company as of the moment of the relevant entry being made in the State Register of Legal Entities of the Russian Federation.

4.3 The Seller shall notify the Company of the sale of the Participatory Interest in writing within five (5) business days after the date of entry into force of this Agreement (Clause 6.1).

4.4 In accordance with paragraph 5 of Article 488 of the Civil Code of the Russian Federation, the Parties have agreed that until paid by the Purchasers, the Participatory Interest shall not be deemed pledged to the Seller.

5. GOVERNING LAW AND DISPUTE RESOLUTION

5.1 This Agreement shall be governed by, and construed in accordance with, the laws of the Russian Federation.

5.2 Any dispute arising out of or in connection with this Agreement shall be settled by the Arbitrazh Court of the City of Moscow.

6. MISCELLANEOUS

6.1 This Agreement shall come into force on the date of its execution by the Parties and certification by the Notary.

6.2 The Parties signing this Agreement shall confirm in the presence of the Notary that they are not limited in their legal capacity, are not under custody, are capable to execute and protect their rights and perform their obligations by themselves, do not suffer from illnesses impeding them from understanding the essence of signed agreement and circumstances of its execution, and are not in any state where they are incapable of understanding the meaning of their actions and/or control their actions, that there are no circumstances forcing them to enter into this deal on extremely unfavorable terms and conditions.

6.3 The expenses of certification of this Agreement shall be borne by Purchaser 1.

6.4 This Agreement is made and executed in four bilingual counterparts, each in English and Russian languages, one of which is stored with the Notary, and one handed to each of the Parties, and each counterpart is equally binding. The text of the Agreement has been read aloud. In the event of any conflict between English and Russian versions, the Russian language version shall prevail.

IN WITNESS WHEREOF this Agreement was executed by the Seller and the Purchasers represented by their duly authorized representatives:

for the Seller

For Purchaser 1

For Purchaser 2

2.4 Покупатели получил одобрение ФАС на заключение и исполнения настоящего Договора.

2.5 Продавец и Покупатели получили необходимые корпоративные одобрения для заключения настоящего Договора и исполнения обязательств по нему, включая, среди прочего, получение одобрения совета директоров каждого Покупателя (протокол б/н от [●] и протокол б/н от [●]) и совета директоров Продавца (протокол б/н от [●], решение Продавца б/н от [●]).

3. ПОКУПНАЯ ЦЕНА И УСЛОВИЯ ОПЛАТЫ

3.1 Покупатель 1 заплатит Продавцу всю Покупную цену в соответствии с условиями отдельного соглашения между Покупателями и Продавцом.

4. ПЕРЕДАЧА ПРИОБРЕТАЕМОЙ ДОЛИ

4.1 В дату настоящего Договора Продавец и Покупатели осуществляют подписание настоящего Договора и обеспечивают его нотариальное удостоверение у нотариуса города Москвы [●] («Нотариус»), в помещении нотариальной конторы по адресу: [●].

4.2 Покупатели осуществляют права и несут обязанности участников Общества с момента внесения соответствующей записи в Единый государственный реестр юридических лиц Российской Федерации.

4.3 Продавец обязан письменно уведомить Общество о продаже Приобретаемой доли в уставном капитале Общества в течение 5 (пяти) рабочих дней с даты вступления настоящего Договора в силу (пункт 6.1).

4.4 В соответствии с п. 5 ст. 488 Гражданского кодекса Российской Федерации Стороны согласовали, что до момента оплаты Покупателями Приобретаемая доля не находится в залоге у Продавца.

5. ПРИМЕНИМОЕ ПРАВО И РАЗРЕШЕНИЕ СПОРОВ

5.1 Настоящий Договор подчиняется праву Российской Федерации и толкуется в соответствии с ним.

5.2 Любой спор, вытекающий из настоящего Договора или связанный с ним, должен разрешаться в Арбитражном суде города Москвы.

6. ОБЩИЕ ПОЛОЖЕНИЯ

6.1 Настоящий Договор вступает в силу с даты его подписания Сторонами и удостоверения Нотариусом.

6.2 Лица, подписавшие Договор, подтверждают в присутствии Нотариуса, что они в дееспособности не ограничены, под опекой, попечительством не состоят, по состоянию здоровья могут самостоятельно осуществлять и защищать свои права и исполнять обязанности, не страдают заболеваниями, препятствующими осознать суть подписываемого договора и обстоятельств его заключения, а также не находятся в ином таком состоянии, когда они не способны понимать значение своих действий и (или) руководить ими, что у них отсутствуют обстоятельства, вынуждающие совершить указанную сделку на крайне невыгодных для сторон условиях.

6.3 Расходы по удостоверению настоящего Договора несет Покупатель 1.

6.4 Настоящий Договор заключен в четырех двуязычных экземплярах, каждый на английском и русском языках, один из которых хранится у Нотариуса, и по одному передается каждой из Сторон, и каждый такой экземпляр имеет полную и равную силу. В случае расхождений между русской и английской версиями настоящего Договора, приоритет имеет русская версия.

В ПОДТВЕРЖДЕНИЕ ВЫШЕИЗЛОЖЕННОГО, Продавец и Покупатели, в лице своих должным образом уполномоченных представителей, подписали настоящий Договор:

за Продавца

За Покупателя 1

За Покупателя 2


SCHEDULE 6

PARTICULARS OF THE COMPANY

Name of Company:	NeoPhotonics Corporation, LLC
Main state registration number:	1127746681710
Tax Identification Number:	7714882784
Place of incorporation:	Russian Federation
Address of registered office:	Volgogradsky Prospekt 42, building 5, Moscow 109316, Russia
Type of company:	Limited liability company
Authorised capital:	RUB 9,814,867
Issued capital:	RUB 9,814,867
Type of the Participatory Interest:	Participatory interest
General director:	Novica Mrdovic
Chief accountant:	Anna Dmitrieva

SCHEDULE 7

FORMS OF STANDARD PURCHASE ORDERS

 <p>NEOPHOTONICS (CHINA) CO., LTD. AEOCODE:AEOCN4403041797, USCI 91440300618836109Y NEO BLD NO.8,12TH SOUTH KEJI RD,SOUTH HI-TECH PARK SHENZHEN, GUANGDONG, 518057 CHINA</p> <p>Phone: 86 755 26748181/26748182 Fax: 86 755 26748187</p> <p>VENDOR:</p>					PURCHASE ORDER				
					PURCHASE ORDER NUMBER		REVISION		PAGE
		0		1 of 2					
<p>This Purchase Order Number must appear on all order acknowledgements, packing lists, cartons, invoices and correspondence related to this order.</p> <p>BILL TO: NEOPHOTONICS (CHINA) CO., LTD. AEOCODE:AEOCN4403041797, USCI 91440300618836109Y NEO BLD NO.8,12TH SOUTH KEJI RD,SOUTH HI-TECH PARK SHENZHEN, GUANGDONG, 518057 CHINA</p>									
<p>All invoices should be sent electronically in pdf format to ap.sz@neophotonics.com. There may be a delay in processing if invoices are sent via Postal Service.</p>									
VENDOR NUMBER		DATE OF ORDER / BUYER		REVISED DATE / BUYER					
PAYMENT TERMS		SHIP VIA							
FREIGHT TERMS		REQUESTOR / DELIVER TO		CONFIRM TO / TELEPHONE					
ITEM	PART NUMBER / DESCRIPTION / MFR PART NUMBER / MANUFACTURER NAME / CANCELLED	REV	SHIP TO LOCATION	PROMISED DATE / NEED BY DATE	QUANTITY	UNIT	UNIT PRICE (USD)	EXTENDED PRICE (USD)	TAX

1						Each			N	
<p>1. This document was duplicated electronically. Approvals obtained electronically, no signature required. Purchasing personnel must authorize all changes.</p> <p>2. Vendors are reminded to check the ordered item revision, the latest drawing revision and your related production Doc to make sure they are consistent. Otherwise vendors would be responsible for all the loss caused from the discrepancy.</p> <p>3. This Purchase Order is subject to NeoPhotonics Corporation Terms and Conditions which are incorporated here in and made a part of this agreement. *** NeoPhotonics Corporation Confidential Information***.</p>										
							TOTAL (USD):			
							AUTHORIZED SIGNATURE			

Notes: All prices and amounts on this order are expressed in USD

SUPPLIER – TERMS AND CONDITIONS

1. **Entire Agreement; Inconsistencies; Acceptance of Order.** This Purchase Order ("Order") contains the entire terms and conditions of the agreement between the Seller named on the front side hereof ("Seller") and NeoPhotonics Corporation, a Delaware corporation ("NeoPhotonics") regarding the articles, materials, parts and work covered by this Order ("Goods"). NeoPhotonics hereby objects to all additional terms or modifications to this Order proposed by Seller contained in any communication from Seller or proposed by any course of dealing or performance between Seller and NeoPhotonics, and no such additional terms or modifications shall be binding on NeoPhotonics without NeoPhotonics's prior express written consent thereto. NeoPhotonics's failure to further object to any such additional terms or modifications contained in any communication from Seller or proposed by any course of dealing or performance between Seller and NeoPhotonics shall not be deemed a waiver of the provisions hereof or an approval of the terms or modifications therein. Unless NeoPhotonics has provided prior express written consent to the contrary, any term or condition of the reverse side of this Order shall prevail in the event that there is an inconsistency between it and any term or condition of the front side of this Order. Any term or condition of this Order shall prevail in the event that there is an inconsistency between it and any term or condition of any communication from Seller or of any course of dealing or performance between Seller and NeoPhotonics. Seller shall be deemed to have accepted, and shall be bound by, this Order and its terms and conditions upon the earliest of: (a) the date Seller returns to NeoPhotonics a written acknowledgement thereof; (b) the date Seller ships to NeoPhotonics any of the Goods; and (c) the date five (5) business days after NeoPhotonics's delivery to Seller of this Order unless Seller has notified NeoPhotonics within such time that Seller shall not be so bound.
2. **Price.** This Order shall not be filled at prices higher than those shown on the front side hereof unless such increased prices have been authorized in writing by NeoPhotonics. If there is no price stated on the front side hereof, the price shall be deemed to be the price last quoted to NeoPhotonics (as evidenced by NeoPhotonics's business records) or the prevailing market price for the Goods, whichever is lower. Seller warrants that the price for Goods sold to NeoPhotonics under this Order is not greater than the price for comparable goods sold in comparable quantities to any other purchaser thereof. If Seller decreases prices to any other purchaser for any Goods to be furnished hereunder, the price of all Goods yet unshipped to NeoPhotonics shall be deemed adjusted to such lower prices. Unless otherwise specifically agreed to by NeoPhotonics, prices shown on this Order are deemed to include all charges associated with the sale, and delivery to NeoPhotonics, of the Goods, including without limitation charges for shipping, packing, insurance, and taxes imposed by any taxing authority with respect to the transfer to NeoPhotonics of possession, title or both to the Goods, including, but not limited to, sales, use, property and value added taxes, but excluding taxes determined with respect to the net income of NeoPhotonics.
3. **Packing and Shipment.** Goods shall be prepared for shipment in a manner that is in accordance with standard commercial practice and is adequate to ensure safe arrival of the Goods to a designated destination Unless otherwise specifically provided on the front side of this Order, the Goods shall be delivered to NeoPhotonics F.O.B. destination. Shipments will be made freight prepaid at the lowest freight charges available, using the carrier selected by NeoPhotonics.
4. **Delivery.** Seller shall deliver the completed Goods in strict accordance with the scheduled delivery date and in the exact quantities and at the exact specifications set forth on the front side hereof, and the obligations of Seller to meet the delivery dates, quantities, and specifications set forth herein are of the essence of this Order. Goods that are delivered in advance of the scheduled delivery date are delivered at the risk of Seller and may, at NeoPhotonics's option, be returned at Seller's expense for proper delivery and/or have payment therefor withheld by NeoPhotonics until the date that payment would have been due had the Goods been actually delivered on their scheduled delivery date. In addition to any other rights or remedies provided to NeoPhotonics by law or under this Order, NeoPhotonics may in the case of any delay: (a) extend Seller's time of performance and upon request of NeoPhotonics, Seller shall ship Goods not delivered on time via expedited routing necessary to recover the maximum possible time lost by failure to deliver on schedule; Seller to pay the extra cost of the expedited routing; or (b) immediately terminate the undelivered portion of the Order at no cost to NeoPhotonics.
5. **Invoices and Payment.** Unless otherwise expressly provided in this Order, no invoices shall be issued nor payments made prior to delivery. Within twenty-four (24) hours after shipment of any Goods pursuant to this Order, Seller shall mail to NeoPhotonics copies of all packing slips together with a separate invoice for each Order in duplicate or bearing the NeoPhotonics Order number. Unless freight and other charges are itemized, any discount will be taken on the full amount of invoices. All payments are subject to adjustment for shortage or rejection. Payment shall be made no earlier than thirty (30) days after acceptance by NeoPhotonics of the associated Goods unless otherwise specifically provided on the front side of this Order.
6. **Warranties.** Notwithstanding NeoPhotonics's inspection and acceptance of the Goods, Seller warrants that all Goods delivered pursuant to this Order will (i) be free from defects in material and workmanship, (ii) be merchantable, (iii) conform to applicable samples or other descriptions furnished or adopted by Seller, (iv) comply with Seller's published specifications in effect as of the effective date of this Agreement unless such specifications have been superseded by other specifications, drawings, samples or descriptions agreed to between NeoPhotonics and Seller, and (v) to the extent such Goods are not manufactured pursuant to detailed designs furnished by NeoPhotonics, be free from defects in design, suitable for the intended purposes, and free from infringement of third party rights (including without limitation patent, copyright, trade secret, trademark, and other proprietary rights). The foregoing warranties are in addition to all other warranties, whether express or implied, given by Seller to NeoPhotonics or imposed by law. All warranties of Seller, together with the services warranties and guarantees, if any, shall run to NeoPhotonics and its customers.
7. **Quality Control and Inspection.** NeoPhotonics shall have the right to inspect, test, and approve at any time, and Seller shall provide all reasonable facilities and assistance to NeoPhotonics in connection therewith, (a) at the place of manufacture and prior to shipment, all Goods ordered, and (b) the facilities at which Goods are manufactured. Notwithstanding any prior inspections or payments made hereunder by NeoPhotonics, all Goods shall be subject to final inspection and acceptance at NeoPhotonics's facility within not less than thirty (30) days after delivery of the Goods at NeoPhotonics's facility. In the event that NeoPhotonics receives Goods whose defects or nonconformities are not apparent on initial examination, the time for final inspection and acceptance of such Goods shall be extended to a reasonable period of time after such defects or nonconformities become apparent. No inspection or test made prior to final inspection and acceptance shall relieve Seller from responsibility for defects or other failure to meet the requirements of this Order. The criteria for acceptance and/or approval of all Goods and facilities at which Goods are manufactured shall be NeoPhotonics's option, (a) NeoPhotonics's judgment and/or (b) compliance with Seller's published specifications in effect as of the date of this Order unless such specifications have been superseded by other specifications, drawings, samples or descriptions agreed to between NeoPhotonics and Seller. If NeoPhotonics determines that any Goods are defective or do not meet all specifications (either before acceptance or under the terms of Paragraph 6 - "Warranties"), NeoPhotonics shall have the right, at its sole option, to (i) reject such Goods and obtain a refund of the purchase price or (ii) require repair or replacement of the Goods by and at Seller's expense and risk. If Seller fails to repair or replace defective Goods within thirty (30) days after NeoPhotonics's request thereof, NeoPhotonics may, at its sole option (i) repair or replace such Goods and charge to the Seller any cost incurred by NeoPhotonics, which charge Seller shall pay NeoPhotonics, or (ii) without further notice, terminate this Order for default in accordance with Paragraph 12 - "Termination and Cancellation; Survival" hereof, or (iii) require an appropriate reduction in the price. Payment for any Goods hereunder shall not be deemed an acceptance thereof. Failure to inspect the Goods shall not be deemed to constitute (i) acceptance of any defective or nonconforming Goods, or (ii) a waiver of NeoPhotonics's rights or remedies arising by virtue of any defect or nonconformity with the requirements of this Order. NeoPhotonics's rights under this Paragraph 7 shall be in addition to all other rights of NeoPhotonics under this Order and applicable law. If any Goods subject to this Order, or any components thereof, are to be manufactured by subcontractors, Seller shall require such subcontractors to comply with this provision.
8. **Changes.** Any changes, waivers or additions to the terms and conditions of this Order shall bind NeoPhotonics only if they are in a writing signed by a duly authorized employee of NeoPhotonics. NeoPhotonics shall have the right at any time, by written order, to make changes within the general scope of this Order, in one or more of the following: (1) drawings, designs, specifications, and/or instructions for any of the Goods, (2) method of shipping or packing, (3) place of inspection, delivery or acceptance, (4) quantities, and/or (5) delivery schedules. Seller shall comply with all such changes. If any such change causes a decrease or increase in Seller's cost and/or in the time required for Seller's performance, an equitable adjustment in the price and/or delivery schedule, as applicable, will be made by the parties in writing. Unless Seller provides NeoPhotonics with an itemized statement of adjustment to the cost and/or time for performance within ten (10) business days after Seller's receipt of NeoPhotonics's change notice, Seller shall be conclusively deemed to have waived all claims against NeoPhotonics with respect thereto. NeoPhotonics may act upon any such claim at any time prior to final payment under this Order. Failure of the parties to agree upon any adjustment to be made under this clause shall not excuse Seller from proceeding with this Order as changed.
9. **Responsibility for NeoPhotonics's Property.** All Goods produced by Seller pursuant to NeoPhotonics's designs or specifications, and all inventions, improvements, developments and discoveries conceived, discovered, made, developed or first reduced to tangible work product by Seller and relating to Goods produced by Seller pursuant to NeoPhotonics's designs or specifications, shall be the sole property of NeoPhotonics. Seller hereby does and will assign fully to NeoPhotonics all such inventions, improvements, developments and discoveries. Unless otherwise provided in this Order, Seller, upon delivery to it or acquisition by it of any supplies, tooling, molds, patterns, drawings or other materials or equipment, the title to which is in NeoPhotonics (collectively the "Materials"), assumes the risk of, and shall be responsible for, any loss thereof or damage thereto, and shall return such Materials in good condition (except for reasonable wear and tear and except to the extent that such Materials have been incorporated in the Goods delivered under this Order or have been consumed in normal performance of work under this Order), to NeoPhotonics upon NeoPhotonics's request or upon completion, termination or cancellation of this Order.
10. **Indemnities; Insurance.** Seller shall, at its own expense, defend, indemnify and hold harmless NeoPhotonics and its customers from any damage, liabilities, claims, losses, and expenses (including without limitation attorneys' fees) with respect to any action, claim or proceeding to the extent such damage, liabilities, claims, losses, and expenses are related to or caused by (a) any act or omission by Seller, its agents, employees or contractors, or (b) any breach of any of Seller's warranties or obligations under this Order. If Goods become, or are likely to become, the subject of any claim of infringement of any patent, trademark, copyright or other proprietary right, Seller shall, at Seller's expense, (i) procure the right for NeoPhotonics and its customers to continue using the Goods, (ii) replace or modify the Goods so that they become non-infringing or (iii) at NeoPhotonics's option, refund to NeoPhotonics the amount paid for the items. If neither of the foregoing alternatives is available on terms that in NeoPhotonics's judgment are reasonable, NeoPhotonics may, in addition to any other remedies it may have, terminate this Agreement without further liability to Seller. Seller shall maintain such public liability insurance (including without limitation products liability, completed operations, contractors' liability and protective liability, automobile liability (including without limitation non-owned automobile liability), workers' compensation, employees' liability, and infringement insurance) as will adequately protect NeoPhotonics against such damage, liabilities, claims, losses, and expenses. Seller agrees to submit certificates of insurance, evidencing coverage in accordance with this paragraph, when requested by NeoPhotonics.
11. **Titles and Risk of Loss.** Unless otherwise expressly provided in this Order, Seller shall have title to and bear the risk of any loss or damage to the Goods until the Goods are delivered and accepted in conformity with this Order. Upon such delivery and acceptance, title shall pass from Seller and Seller's responsibility for loss or damage shall cease, except for that resulting from Seller's negligence or failure to comply with this Order.
12. **Termination and Cancellation; Survival.** NeoPhotonics may terminate the whole or any part of this Order for convenience at any time prior to the delivery of the Goods by delivering written notice of termination to Seller. NeoPhotonics may, without liability, by written notice to Seller, cancel the whole or any part of this Order immediately: (i) if Seller fails to effect delivery hereunder, (ii) if Seller fails to make progress in work so as to endanger performance, (iii) if Seller fails to provide adequate assurances of its performance hereunder in a form acceptable to NeoPhotonics no later than five (5) business days after NeoPhotonics's delivery to Seller of a written request therefore, (iv) in the event that any voluntary or involuntary proceedings are filed by or against Seller pursuant to the provisions of any bankruptcy or insolvency law or (v) in the event of the appointment with or without the Seller's consent, of an assignee for the benefit of creditors or of a receiver. If NeoPhotonics cancels this Order in whole or in part pursuant to this Paragraph 12 - "Termination and Cancellation", in addition to any other remedies provided herein or by law, NeoPhotonics may procure, upon terms and in such manner as NeoPhotonics may deem appropriate, items or services similar to those terminated, and Seller shall be liable to NeoPhotonics for any excess cost for such similar items or services. Seller shall continue with the performance of this Order to the extent, if any, the Order is not terminated or cancelled under the provisions of this Paragraph 12. NeoPhotonics may also require Seller to transfer title and deliver to NeoPhotonics, in the manner and to the extent directed by NeoPhotonics, any fully or partially completed Goods that Seller has specifically produced or specifically used for the performance of such part of this Order as has been terminated. Payment for completed Goods delivered to and accepted by NeoPhotonics shall be at the Order price; payment for partially completed Goods delivered and accepted by NeoPhotonics shall be in an amount to be agreed upon by NeoPhotonics and Seller. Seller's obligations under Paragraphs 6, 9, 10, 13, 14, and 15 shall survive any termination or cancellation of this Order.
13. **Disclosures and Use of Information and Items.** Seller shall keep confidential all designs, processes, drawings, specifications, reports, data and other technical or proprietary information, and all Materials and the features for all Materials, furnished or disclosed to the Seller by NeoPhotonics in connection with this Order (collectively "Confidential Materials"). Unless otherwise provided herein or authorized by NeoPhotonics in writing, Seller (a) shall not use any such Confidential Materials, except in the performance of this Order, and (b) shall not disclose any such Confidential Materials to anyone who has not agreed to obligations no less restrictive than those set forth in this Paragraph, and (c) shall treat all such Confidential Materials with no less than reasonable care. Upon completion or termination or cancellation of this Order, Seller shall return to NeoPhotonics all tangible media that contain or in which are fixed any such Confidential Materials or make such other disposition thereof as may be directed or approved by NeoPhotonics. Seller may not use NeoPhotonics's name in
14. **Liability of NeoPhotonics; Seller Exclusive Remedy.** NeoPhotonics's entire liability to Seller, and Seller's exclusive remedy, for any cancellation or termination of this Order, shall not exceed the lesser of a pro rata portion of the Order price, or the cost, of finished Goods to be delivered within 30 days after such cancellation or termination, of 30 days of work in progress, and of 30 days of raw materials that Seller demonstrates cannot be diverted to other uses, each of the cost and pro rata portion as set forth in a written, detailed claim for such amount that is delivered by Seller to NeoPhotonics within ten (10) business days after NeoPhotonics's notice of cancellation or termination. If NeoPhotonics fails to pay Seller, Seller's exclusive remedy shall be to recover the Goods or, in the event the Goods have been sold to a third party, to recover from NeoPhotonics an amount equal to the purchase price paid by such third party
15. **General.** Neither party shall have the right to make commitments of any kind for or on behalf of any other party without the prior written consent of such other party. Seller shall not assign or transfer this Order, or any rights or obligations under this Order, without the prior written consent of NeoPhotonics. This Order shall be governed in all respects by the laws of the United States of America and by the laws of the State of California; as such laws are applied to agreements entered into and to be performed entirely within California between California residents. Except for actions seeking to enforce any order or judgment of any federal or state court(s) located in California, each of the parties irrevocably consents to the exclusive personal jurisdiction of such federal and state court(s), as applicable, for any matter arising out of or relating to this Order. If any dispute arises between the parties with respect to the matters covered by this Order which leads to a proceeding to resolve such dispute, the prevailing party in such proceeding shall be entitled to receive such prevailing party's reasonable attorneys' fees, expert witness fees and out-of-pocket costs incurred in connection with such proceeding, in addition to any other relief to which such prevailing party may be entitled. A breach by Seller of any of the promises or agreements contained herein will result in irreparable and continuing damage to NeoPhotonics for which there will be no adequate remedy at law, and NeoPhotonics shall be entitled to injunctive relief and/or a decree for specific performance, and such other relief as may be proper (including monetary damages if appropriate). The rights and remedies provided by NeoPhotonics herein shall be cumulative and in addition to any other rights and remedies provided by law or equity or those provide under the Uniform Commercial Code. All claims for monies due or to become due from NeoPhotonics under this Order are subject to deduction by NeoPhotonics for any setoff or counterclaim that NeoPhotonics may have against Seller. If any provision of this Order is held by a court of law to be illegal, invalid or unenforceable, (i) that provision shall be deemed amended to achieve as nearly as possible the same economic effect as the original provision, and (ii) the legality, validity and enforceability of the remaining provisions of this Order shall not be affected or impaired thereby. This Order and its provisions shall not be modified, amended or waived, except in a writing executed by both parties. Seller shall not subcontract or permit anyone other than Seller's employees to manufacture the Goods or perform any other work required to be performed by Seller under this Order without the prior written consent of NeoPhotonics. NeoPhotonics may deliver payment and/or acceptance under this Order if such payment and/or acceptance are made impossible or impacted by causes beyond NeoPhotonics's control. Whenever Seller has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Order, Seller shall immediately give notice thereof, including all relevant information with respect thereto, to NeoPhotonics. Seller warrants that no law or regulation of any governmental authority (including without limitation any federal, state or local law or regulation) has been violated by Seller in performance of its obligations under this Order. If the goods ordered herein are purchased for incorporation into products sold under United States Government contract or subcontract, the terms required or reasonably desired to be inserted by NeoPhotonics shall be deemed to apply to this Order. Seller shall comply with NeoPhotonics's corporate ethics and other relevant policies, copy(ies) of which are available from the office from which this Order was received
16. As per «FRAMEWORK OF STANDARDS TO SECURE AND FACILITATE GLOBAL TRADE », supplier should optimize the supply chain security continually to higher AEO lever.



NEOPHOTONICS DONGGUAN CO., LTD.
 B9 BUILDING, CONRAD HI-TECH PARK, SHANG SHA SECTION OF ZHEN AN ROAD, CHANG AN TOWN,
 DONGGUAN, GUANGDONG,
 523850
 CHINA

Phone: 769-89393000/18925248860
 Fax:

VENDOR:

PURCHASE ORDER

PURCHASE ORDER NUMBER	REVISION 0	PAGE 1 of 2
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This Purchase Order Number must appear on all order acknowledgements, packing lists, cartons, invoices and correspondence related to this order.

BILL TO:
 NEOPHOTONICS DONGGUAN CO., LTD.
 B9 BUILDING, CONRAD HI-TECH PARK, SHANG SHA SECTION
 OF ZHEN AN ROAD, CHANG AN TOWN,

DONGGUAN, GUANGDONG,
 523850
 CHINA

All invoices should be sent electronically in pdf format to ap.dg@neophotonics.com. There may be a delay in processing if invoices are sent via Postal Service.

VENDOR NUMBER		DATE OF ORDER / BUYER		REVISED DATE / BUYER					
PAYMENT TERMS		SHIP VIA							
FREIGHT TERMS		REQUESTOR / DELIVER TO		CONFIRM TO / TELEPHONE					
ITEM	PART NUMBER / DESCRIPTION / MFR PART NUMBER / MANUFACTURER NAME / CANCELLED	REV	SHIP TO LOCATION	PROMISED DATE / NEED BY DATE	QUANTITY	UNIT	UNIT PRICE (USD)	EXTENDED PRICE (USD)	TAX
1						Each			N
1. This document was duplicated electronically. Approvals obtained electronically, no signature required. Purchasing personnel must authorize all changes. 2. Vendors are reminded to check the ordered item revision, the latest drawing revision and your related production Doc to make sure they are consistent. Otherwise vendors would be responsible for all the loss caused from the discrepancy. 3. This Purchase Order is subject to NeoPhotonics Corporation Terms and Conditions which are incorporated here in and made a part of this agreement. *** NeoPhotonics Corporation Confidential Information***.							TOTAL (USD):		
							AUTHORIZED SIGNATURE		

Notes: All prices and amounts on this order are expressed in USD



B9 Building, Conrad Hi-Tech Park, Shang Sha Section, 523850 Phone: 769-89393000/18925248860 Fax:

SUPPLIER – TERMS AND CONDITIONS

- Entire Agreement; Inconsistencies; Acceptance of Order. This Purchase Order ("Order") contains the entire terms and conditions of the agreement between the Seller named on the front side hereof ("Seller") and NeoPhotonics Corporation, a Delaware corporation ("NeoPhotonics") regarding the articles, materials, parts and work covered by this Order ("Goods"). NeoPhotonics hereby objects to all additional terms or modifications to this Order proposed by Seller contained in any communication from Seller or proposed by any course of dealing or performance between Seller and NeoPhotonics, and no such additional terms or modifications shall be binding on NeoPhotonics without NeoPhotonics's prior express written consent thereto. NeoPhotonics's failure to further object to any such additional terms or modifications contained in any communication from Seller or proposed by any course of dealing or performance between Seller and NeoPhotonics shall not be deemed a waiver of the provisions hereof or an approval of the terms or modifications therein. Unless NeoPhotonics has provided prior express written consent to the contrary, any term or condition of the reverse side of this Order shall prevail in the event that there is an inconsistency between it and any term or condition of the front side of this Order. Any term or condition of this Order shall prevail in the event that there is an inconsistency between it and any term or condition of any communication from Seller or of any course of dealing or performance between Seller and NeoPhotonics. Seller shall be deemed to have accepted, and shall be bound by, this Order and its terms and conditions upon the earliest of (a) the date Seller returns to NeoPhotonics a written acknowledgement thereof, (b) the date Seller ships to NeoPhotonics any of the Goods; and (c) the date five (5) business days after NeoPhotonics's delivery to Seller of this Order unless Seller has notified NeoPhotonics within such time that Seller shall not be so bound.
- Price. This Order shall not be filled at prices higher than those shown on the front side hereof unless such increased prices have been authorized in writing by NeoPhotonics. If there is no price stated on the front side hereof, the price shall be deemed to be the price last quoted to NeoPhotonics (as evidenced by NeoPhotonics's business records) or the prevailing market price for the Goods, whichever is lower. Seller warrants that the price for Goods sold to NeoPhotonics under this Order is not greater than the price for comparable goods sold in comparable quantities to any other purchaser thereof. If Seller decreases prices to any other purchaser for any Goods to be furnished hereunder, the price of all Goods yet unshipped to NeoPhotonics shall be deemed adjusted to such lower prices. Unless otherwise specifically agreed to by NeoPhotonics, prices shown on this Order are deemed to include all charges associated with the sale, and delivery to NeoPhotonics, of the Goods, including without limitation charges for shipping, packing, insurance, and taxes imposed by any taxing authority with respect to the transfer to NeoPhotonics of possession, title or both to the Goods, including, but not limited to, sales, use, property and value added taxes, but excluding taxes determined with respect to the net income of NeoPhotonics.
- Packing and Shipment. Goods shall be prepared for shipment in a manner that is in accordance with standard commercial practice and is adequate to ensure safe arrival of the Goods to a designated destination Unless otherwise specifically provided on the front side of this Order, the Goods shall be delivered to NeoPhotonics F.O.B. destination. Shipments will be made freight prepaid at the lowest freight charges available, using the carrier selected by NeoPhotonics.
- Delivery. Seller shall deliver the completed Goods in strict accordance with the scheduled delivery date and in the exact quantities and at the exact specifications set forth on the front side hereof, and the obligations of Seller to meet the delivery dates, quantities, and specifications set forth herein are of the essence of this Order. Goods that are delivered in advance of the scheduled delivery date are delivered at the risk of Seller and may, at NeoPhotonics's option, be returned at Seller's expense for proper delivery and/or have payment therefor withheld by NeoPhotonics until the date that payment would have been due had the Goods been actually delivered on their scheduled delivery date. In addition to any other rights or remedies provided to NeoPhotonics by law or under this Order, NeoPhotonics may in the case of any delay: (a) extend Seller's time of performance and upon request of NeoPhotonics, Seller shall ship Goods not delivered on time via expedited routing necessary to recover the maximum possible time lost by failure to deliver on schedule; Seller to pay the extra cost of the expedited routing; or (b) immediately terminate the undelivered portion of the Order at no cost to NeoPhotonics.
- Invoices and Payment. Unless otherwise expressly provided in this Order, no invoices shall be issued nor payments made prior to delivery. Within twenty-four (24) hours after shipment of any Goods pursuant to this Order, Seller shall mail to NeoPhotonics copies of all packing slips together with a separate invoice for each Order in duplicate or bearing the NeoPhotonics Order number. Unless freight and other charges are itemized, any discount will be taken on the full amount of invoices. All payments are subject to adjustment for shortage or rejection. Payment shall be made no earlier than thirty (30) days after acceptance by NeoPhotonics of the associated Goods unless otherwise specifically provided on the front side of this Order.
- Warranties. Notwithstanding NeoPhotonics's inspection and acceptance of the Goods, Seller warrants that all Goods delivered pursuant to this Order will (i) be free from defects in material and workmanship, (ii) be merchantable, (iii) conform to applicable samples or other descriptions furnished or adopted by Seller, (iv) comply with Seller's published specifications in effect as of the effective date of this Agreement unless such specifications have been superseded by other specifications, drawings, samples or descriptions agreed to between NeoPhotonics and Seller, and (v) to the extent such Goods are not manufactured pursuant to detailed designs furnished by NeoPhotonics, be free from defects in design, suitable for the intended purposes, and free from infringement of third party rights (including without limitation patent, copyright, trade secret, trademark, and other proprietary rights). The foregoing warranties are in addition to all other warranties, whether express or implied, given by Seller to NeoPhotonics or imposed by law. All warranties of Seller, together with the services warranties and guarantees, if any, shall run to NeoPhotonics and its customers.
- Quality Control and Inspection. NeoPhotonics shall have the right to inspect, test, and approve at any time, and Seller shall provide all reasonable facilities and assistance to NeoPhotonics in connection therewith, (a) at the place of manufacture and prior to shipment, all Goods ordered, and (b) the facilities at which Goods are manufactured. Notwithstanding any prior inspections or payments made hereunder by NeoPhotonics, all Goods shall be subject to final inspection and acceptance at NeoPhotonics's facility within not less than thirty (30) days after delivery of the Goods at NeoPhotonics's facility. In the event that NeoPhotonics receives Goods whose defects or nonconformities are not apparent on initial examination, the time for final inspection and acceptance of such Goods shall be extended to a reasonable period of time after such defects or nonconformities become apparent. No inspection or test made prior to final inspection and acceptance shall relieve Seller from responsibility for defects or other failure to meet the requirements of this Order. The criteria for acceptance and/or approval of all Goods and facilities at which Goods are manufactured shall be, at NeoPhotonics's option, (a) NeoPhotonics's judgment and/or (b) compliance with Seller's published specifications in effect as of the date of this Order unless such specifications have been superseded by other specifications,

drawings, samples or descriptions agreed to between NeoPhotonics and Seller. If NeoPhotonics determines that any Goods are defective or do not meet all specifications (either before acceptance or under the terms of Paragraph 6 - "Warranties"), NeoPhotonics shall have the right, at its sole option, to (i) reject such Goods and obtain a refund of the purchase price or (ii) require repair or replacement of the Goods by and at Seller's expense and risk. If Seller fails to repair or replace defective Goods within thirty (30) days after NeoPhotonics's request thereof, NeoPhotonics may, at its sole option (i) repair or replace such Goods and charge to the Seller any cost incurred by NeoPhotonics, which charge Seller shall pay NeoPhotonics, or (ii) without further notice, terminate this Order for default in accordance with Paragraph 12 - "Termination and Cancellation/ Survival" hereof, or (iii) require an appropriate reduction in the price. Payment for any Goods under this Order shall not be deemed an acceptance thereof. Failure to inspect the Goods shall not be deemed to constitute (i) acceptance of any defective or nonconforming Goods, or (ii) a waiver of NeoPhotonics's rights or remedies arising by virtue of any defect or nonconformity with the requirements of this Order. NeoPhotonics's rights under this Paragraph 7 shall be in addition to all other rights of NeoPhotonics under this Order and applicable law. If any Goods subject to this Order, or any components thereof, are to be manufactured by subcontractor(s), Seller shall require such subcontractor(s) to comply with this provision.

8. Changes. Any changes, waivers or additions to the terms and conditions of this Order shall bind NeoPhotonics only if they are in a writing signed by a duly authorized employee of NeoPhotonics. NeoPhotonics shall have the right at any time, by written order, to make changes within the general scope of this Order, in one or more of the following: (1) drawings, designs, specifications, and/or instructions for any of the Goods, (2) method of shipping or packing, (3) place of inspection, delivery or acceptance, (4) quantities, and/or (5) delivery schedules. Seller shall comply with all such changes. If any such change causes a decrease or increase in Seller's cost and/or in the time required for Seller's performance, an equitable adjustment in the price and/or delivery schedule, as applicable, will be made by the parties in writing. Unless Seller provides NeoPhotonics with an itemized statement of adjustment to the cost and/or time for performance within ten (10) business days after Seller's receipt of NeoPhotonics's change notice, Seller shall be conclusively deemed to have waived all claims against NeoPhotonics with respect thereto. NeoPhotonics may act upon any such claim at any time prior to final payment under this Order. Failure of the parties to agree upon any adjustment to be made under this clause shall not excuse Seller from proceeding with this Order as changed.

9. Responsibility for NeoPhotonics's Property. All Goods produced by Seller pursuant to NeoPhotonics's designs or specifications, and all inventions, improvements, developments and discoveries conceived, discovered, made, developed or first reduced to tangible work product by Seller and relating to Goods produced by Seller pursuant to NeoPhotonics's designs or specifications, shall be the sole property of NeoPhotonics. Seller hereby does and will assign fully to NeoPhotonics all such inventions, improvements, developments and discoveries. Unless otherwise provided in this Order, Seller, upon delivery to it or acquisition by it of any supplies, tooling, molds, patterns, drawings or other materials or equipment, the title to which is in NeoPhotonics (collectively the "Materials"), assumes the risk of, and shall be responsible for, any loss thereof or damage thereto, and shall return such Materials in good condition (except for reasonable wear and tear and except to the extent that such Materials have been incorporated in the Goods delivered under this Order or have been consumed in normal performance of work under this Order), to NeoPhotonics upon NeoPhotonics's request or upon completion, termination or cancellation of this Order.

10. Indemnities; Insurance. Seller shall, at its own expense, defend, indemnify and hold harmless NeoPhotonics and its customers from any damage, liabilities, claims, losses, and expenses (including without limitation attorneys' fees) with respect to any action, claim or proceeding to the extent such damage, liabilities, claims, losses, and expenses are related to or caused by (a) any act or omission by Seller, its agents, employees or contractors, or (b) any breach of any of Seller's warranties or obligations under this Order. If Goods become, or are likely to become, the subject of any claim of infringement of any patent, trademark, copyright or other proprietary right, Seller shall, at Seller's expense, (i) procure the right for NeoPhotonics and its customers to continue using the Goods, (ii) replace or modify the Goods so that they become non-infringing or (iii) at NeoPhotonics's option, refund to NeoPhotonics the amount paid for the items. If neither of the foregoing alternatives is available on terms that in NeoPhotonics's judgment are reasonable, NeoPhotonics may, in addition to any other remedies it may have, terminate this Agreement without further liability to Seller. Seller shall maintain such public liability insurance (including without limitation products liability, completed operations, contractors' liability and protective liability, automobile liability (including without limitation non-owned automobile liability), workers' compensation, employers' liability, and infringement insurance) as will adequately protect NeoPhotonics against such damage, liabilities, claims, losses, and expenses. Seller agrees to submit certificates of insurance, evidencing coverage in accordance with this paragraph, when requested by NeoPhotonics.

11. Title and Risk of Loss. Unless otherwise expressly provided in this Order, Seller shall have title to and bear the risk of any loss or damage to the Goods until the Goods are delivered and accepted in conformity with this Order. Upon such delivery and acceptance, title shall pass from Seller and Seller's responsibility for loss or damage shall cease, except for that resulting from Seller's negligence or failure to comply with this Order.

12. Termination and Cancellation; Survival. NeoPhotonics may terminate the whole or any part of this Order for convenience at any time prior to the delivery of the Goods by delivering written notice of termination to Seller. NeoPhotonics may, without liability, by written notice to Seller, cancel the whole or any part of this Order immediately: (i) if Seller fails to make progress in work so as to endanger performance, (ii) if Seller fails to provide adequate assurances of its performance hereunder in a form acceptable to NeoPhotonics no later than five (5) business days after NeoPhotonics's delivery to Seller of a written request therefore, (iv) in the event that any voluntary or involuntary proceedings are filed by or against Seller pursuant to the provisions of any bankruptcy or insolvency law or (v) in the event of the appointment with or without the Seller's consent, of an assignee for the benefit of creditors or of a receiver. If NeoPhotonics cancels this Order in whole or in part pursuant to this Paragraph 12 - "Termination and Cancellation", in addition to any other remedies provided herein or by law, NeoPhotonics may procure, upon terms and in such manner as NeoPhotonics may deem appropriate, items or services similar to those terminated, and Seller shall be liable to NeoPhotonics for any excess cost for such similar items or services. Seller shall continue with the performance of this Order to the extent, if any, the Order is not terminated or cancelled under the provisions of this Paragraph 12. NeoPhotonics may also require Seller to transfer title and deliver to NeoPhotonics, in the manner and to the extent directed by NeoPhotonics, any fully or partially completed Goods that Seller has specifically produced or specifically used for the performance of such part of this Order as has been terminated. Payment for completed Goods delivered to and accepted by NeoPhotonics shall be at the Order price; payment for partially completed Goods delivered and accepted by NeoPhotonics shall be in an amount to be agreed upon by NeoPhotonics and Seller. Seller's obligations under Paragraphs 6, 9, 10, 13, 14, and 15 shall survive any termination or cancellation of this Order.

13. Disclosures and Use of Information and Items. Seller shall keep confidential all designs, processes, drawings, specifications, reports, data and other technical or proprietary information, and all Materials and the features for all Materials, furnished or disclosed to the Seller by NeoPhotonics in connection with this Order (collectively "Confidential Materials"). Unless otherwise provided herein or authorized by NeoPhotonics in writing, Seller (a) shall not use any such Confidential Materials, except in the performance of this Order, and (b) shall not disclose any such Confidential Materials to anyone who has not agreed to obligations no less restrictive than those set forth in this Paragraph, and (c) shall treat all such Confidential Materials with no less than reasonable care. Upon completion or termination or cancellation of this Order, Seller shall return to NeoPhotonics all tangible media that contain or in which are fixed any such Confidential Materials or make such other disposition thereof as may be directed or approved by NeoPhotonics. Seller may not use NeoPhotonics's name in

14. Liability of NeoPhotonics; Seller Exclusive Remedy. NeoPhotonics's entire liability to Seller, and Seller's exclusive remedy, for any cancellation or termination of this Order, shall not exceed the lesser of a pro rata portion of the Order price, or the cost, of finished Goods to be delivered within 30 days after such cancellation or termination, of 30 days of work in progress, and of 30 days of raw materials that Seller demonstrates cannot be diverted to other uses, each of the cost and pro rata portion as set forth in a written, detailed claim for such amount that is delivered by Seller to NeoPhotonics within ten (10) business days after NeoPhotonics's notice of cancellation or termination. If NeoPhotonics fails to pay Seller, Seller's exclusive remedy shall be to recover the Goods or, in the event the Goods have been sold to a third party, to recover from NeoPhotonics an amount equal to the purchase price paid by such third party.

15. General: Neither party shall have the right to make commitments of any kind for or on behalf of any other party without the prior written consent of such other party. Seller shall not assign or transfer this Order, or any rights or obligations under this Order, without the prior written consent of NeoPhotonics. This Order shall be governed in all respects by the laws of the United States of America and by the laws of the State of California; as such laws are applied to agreements entered into and to be performed entirely within California between California residents. Except for actions seeking to enforce any order or any judgment of any federal or state court(s) located in California, each of the parties irrevocably consents to the exclusive personal jurisdiction of such federal and state court(s), as applicable, for any matter arising out of or relating to this Order. If any dispute arises between the parties with respect to the matters covered by this Order which leads to a proceeding to resolve such dispute, the prevailing party in such proceeding shall be entitled to receive such prevailing party's reasonable attorneys' fees, expert witness fees and out-of-pocket costs incurred in connection with such proceeding, in addition to any other relief to which such prevailing party may be entitled. A breach by Seller of any of the promises or agreements contained herein will result in irreparable and continuing damage to NeoPhotonics for which there will be no adequate remedy at law, and NeoPhotonics shall be entitled to injunctive relief and/or a decree for specific performance, and such other relief as may be proper (including monetary damages if appropriate). The rights and remedies provided by NeoPhotonics herein shall be cumulative and in addition to any other rights and remedies provided by law or equity or those provide under the Uniform Commercial Code. All claims for monies due or to become due from NeoPhotonics under this Order are subject to deduction by NeoPhotonics for any setoff or counterclaim that NeoPhotonics may have against Seller. If any provision of this Order is held by a court of law to be illegal, invalid or unenforceable, (i) that provision shall be deemed amended to achieve as nearly as possible the same economic effect as the original provision, and (ii) the legality, validity and enforceability of the remaining provisions of this Order shall not be affected or impaired thereby. This Order and its provisions shall not be modified, amended or waived, except in a writing executed by both parties. Seller shall not subcontract or permit anyone other than Seller's employees to manufacture the Goods or perform any other work required to be performed by Seller under this Order without the prior written consent of NeoPhotonics. NeoPhotonics may delay payment and/or acceptance under this Order if such payment and/or acceptance are made impossible or impractical by causes beyond NeoPhotonics's control. Whenever Seller has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Order, Seller shall immediately give notice thereof, including all relevant information with respect thereto, to NeoPhotonics. Seller warrants that no law or regulation of any governmental authority (including without limitation any federal, state or local law or regulation) has been violated by Seller in performance of its obligations under this Order. If the goods ordered herein are purchased for incorporation into products sold under United States Government contract or subcontract, the terms required or reasonably desired to be inserted by NeoPhotonics shall be deemed to apply to this Order. Seller shall comply with NeoPhotonics's corporate ethics and other relevant policies, copy(ies) of which are available from the office from which this Order was received.

16. As per «FRAMEWORK OF STANDARDS TO SECURE AND FACILITATE GLOBAL TRADE », supplier should optimize the supply chain security continually to higher AEO level.

SCHEDULE 8

LIST OF DOCUMENTATION FOR PRODUCTION PROCESS

Document No.	Product	Type	Document Description
D000027509	CFP2	Specification	SPEC, PT-C24C3LDCL, CFP2 TVR, 100G CFP2 LR4 TRANSCEIVER, TELECOM AND DATACOM, 10KM C-TEMP DUAL-RATE G2
D000027510	CFP2	Specification	SPEC, PT-C24C3LECL, CFP2 TVR, 100G CFP2 LR4 TRANSCEIVER, TELECOM AND DATACOM, 10KM C-TEMP SINGLE-RATE G2
D000028429	CFP2	Specification	RevA1.0_4x28G TOSA_OL3183M_171208
D000031498	CFP2	Specification	4x28G Q-ROSA_PQR-C44C7PLCL SPEC_RevA1.1_181203
D000031763	CFP2	QCFC	Neo_Russia CFP2-LR4 G2 QCFC Rev A
D000031764	CFP2	WI	HOTBAR
D000031765	CFP2	WI	Visual inspection
D000031766	CFP2	WI	module assembly
D000031767	CFP2	WI	LC interface cleaning
D000031768	CFP2	WI	Testing
D000031769	CFP2	WI	Burn in
D000031770	CFP2	WI	temperature cycle
D000031771	CFP2	WI	eeprom check
D000031772	CFP2	WI	FQC check
D000031773	CFP2	WI	packing
D000031774	CFP2	WI	Rework WI

D000031869	CFP2	TS	TS_1000042365_V1.0
D000031872	CFP2	TS	TS_1000042366_V1.0
D000027501	CFP2	EEPROM	EEPROM MAP, PT-C24C3LDCL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP DUAL-RATE G2
D000027502	CFP2	EEPROM	EEPROM MAP, PT-C24C3LECL, CFP2 TVR, 100G CFP2, TELECOM AND DATACOM, 10KM C-TEMP SINGLE-RATE G2
D000027272_C	CFP2	PCB Outline Drawing	PCB OUTLINE DRAWING, CFP2-LR4 G2
D000028476	CFP2	FW	Firmware History Affair Note--CFP2_LR4_G2 - Version D
23-30430-01-J	AWG	Specfication	SPECIFICATION, STANDARD PRODUCT,100GHZ WIDEBAND ATHERMAL AWG_
D000031838	AWG	QCFC	Rev.A Curve dice phaseII Athermal AWG (100G)QCFC
D000031775	AWG	WI	Fiber and connector Appearance Common Inspection Criteria doc Rev_A
D000031828	AWG	WI	SWS system calibration _Rev A
D000031829	AWG	WI	Athermal O-ring Packaging Assembly work instruction _Rev A
D000031830	AWG	WI	Return Loss Test Work Instruction _Rev A
D000031831	AWG	WI	Fiber_connector_endface_cleaning work instruction _Rev A
D000031833	AWG	WI	Athemal AWG Packaging Work Instruction _Rev A
D000031834	AWG	WI	Label Controlling and Printing Work Instruction _Rev A
D000031835	AWG	WI	PLC Product Final Visual Inspection _Rev A
D000031836	AWG	WI	Oven profile and operation _Rev A
D000031837	AWG	WI	Athermal Product Test Procedure _Rev A
D000031839	AWG	WI	A_AWG Inspection Criteria_A
D000031918	AWG	WI	Generate Datasheet Work Instruction Rev A
D000031832	AWG	WI	OP GDE,Operation Rule of Instrument Facility for ESZ-2CAESZ-3CAESZ-4CA High Low Temperature Chamber _Rev A
D000031775	General	Quality control	Fiber and connector Appearance Common Inspection Criteria doc Rev_A
D000031791	General	Quality control	PCBA inspection criteria A
D000031834	General	Quality control	Q-TOSA,Q-ROSA Final Inspection Criteria Rev A
D000031840	General	Quality control	Die-casting Parts incoming inspection criteria Rev A
D000031841	General	Quality control	Passive machine parts inspection criteria A
D000031842	AWG	Quality control	FA ASSY Cosmetic Inspection Criteria _Rev A
D000031839	AWG	Quality control	A_AWG Inspection Criteria_A
D000031943	CFP2	Quality control	CFP Module Inspection Criteria _Rev_A

SCHEDULE 9

SELLER'S PRODUCTION SPECIFICATION AND YIELD TARGETS

Production Yield for NeoPhotonics Module Products

As a deliverables item, personnel will:

- Train NEO-RU current engineers in NeoChina plant for manufacturing technology transfers as required
- to produce AAWG modules products (using NeoPhotonics qualified athermal subassembly) and
- CFP2-LR4 module products (using NeoPhotonics qualified TOSA/ROSA subassemblies).

to NeoPhotonics production specifications with *normalized yields*. AAWG modules and CFP2-LR4 modules are collectively the "Products". This Schedule defines normalized yields for the Products.

The Products are specifically as follows:

Product	PN
AAWG	1000042377
CFP2 LR4 single rate	1000042366

Yield refers to the **percentage** of non-defective items of all produced items, and is indicated by the ratio of the number of non-defective items against the number of manufactured items.

Yield variance is the difference between actual output and standard output of a **production** or **manufacturing** process, based on standard inputs of materials and labor.

First pass yield (FPY) is defined as the number of units coming out of a process divided by the number of units going into that process over a specified period of time. Only good units with no rework or scrap are counted as coming out of an individual process.

The actual **yield** is the actual amount produced when the production process is carried out. AAWG and CFP2-OR4 modules yield is specifically concerned with **First pass yield**, or FPY. Over time, there is normal variation in the output of the set of production process that precede the **First pass yield** determination. The measurement of **First pass yield** for each product is determined as noted in the applicable product assembly work instructions.

The maximum **percentage yield** for a product process is 100%; the average **yield** is calculated using sampling from a population. The lowest **percentage yield** under normal operation is reflected in control limits that reflect three sigma variation on the normal process. For example, average percentage yield of 85% with standard deviation to the sample of the population of 5% means that the **upper control limit** (UCL) would be 100% (85% + 3*5%) and the **lower control limit** (LCL) would be 70% (85% - 3*5%). Normalized yield is defined as **percentage yield** that is within the range of the UCL and LCL. Therefore **Target Yield** for tech transfer of CFP2-LR4 and for AAWG is defined as the **LCL** of **First pass yield**.

Target Yield is based on NeoPhotonics China production data from over the period February through September 2018 as follows:

Product	100G AAWG	CFP2-LR4
Average percentage yield FPY	89.1%	85.6%
Standard deviation of sample in FPY measures	2.3%	4.5%
UCL	96.0%	99.1%
LCL	82.1%	72.1%
Target Yield	82%	72%

Achievement of **Target Yield** on first pass as shown above is within the range of LCL to UCL based on NeoPhotonics China production data from over time.

SCHEDULE 10
TECHNICAL SERVICES AGREEMENT

Dated December __, 2018

TECHNICAL SERVICES AGREEMENT

between

NEOPHOTONICS CORPORATION, LLC

and

NEOPHOTONICS CORPORATION

This agreement is made the __ day of December, 2018

between

NEOPHOTONICS CORPORATION, LLC, a company registered in the Russian Federation, main state registration number 1127746681710, located at Volgogradsky Prospekt 42, building 5, Moscow 109548, Russia (the “**Client**”);

and

NEOPHOTONICS CORPORATION, a company incorporated under the laws of Delaware, the United States of America, located at 2911 Zanker Road, San Jose, CA 95134 United States of America (the “**Consultant**”).

WHEREAS:

- A. The Consultant agreed to sell 100% of the outstanding participation interests in the capital of the Client to JSC "RUSNANO" (the “**Purchaser**”) and its affiliate pursuant to the Framework Purchase Agreement dated December ____, 2018 (the “**FPA**”);
- B. The Purchaser wishes the Client to receive certain technical services from the Consultant after the completion of the Tech Transfer (as defined in the FPA);
- C. The Consultant has agreed to provide such services to the Client; and
- D. The Parties have agreed that the services will be undertaken on the basis of this Agreement (as defined below).

THE PARTIES AGREE AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1. The following words and phrases have the meaning set out next to them unless the context otherwise requires:

AAWG means Athermal Arrayed Waveguide Grating (100 GHz 40 channel module);

Affiliate or **Affiliated** means in relation to a person (a) a person directly or indirectly Controlled by, or under common Control with that person; or (b) a person owning or controlling fifty (50) per cent or more of the issued voting securities or beneficial interests of the first person; or (c) a director, partner or member of the immediate family of a director or partner, of the first person and in the case of a trust, any trustee or beneficiary (actual or potential) of that trust.

Agreement means this technical services agreement including any attachments or schedules;

Business Day means any day excluding a Saturday, Sunday or holiday on which banks are open for business both in the Russian Federation and in the United States of America;

CFP2-LR4 means CFP2-LR4 100 Gbps transceiver modules;

Commencement Date means the next business day after the date of completion of the Tech Transfer (as defined in the FPA);

Confidential Information means, subject to the exceptions in clause 11, any information of whatever kind whether communicated verbally, in writing or in any other form which is original information or a work product that has been derived or constructed from or using that original information; and relates to the disclosing Party's technology, know how, business, finances or customers or any such information relating to any associated company, Consultant or customer of the disclosing Party and is received as a result of the discussions leading up to this Agreement or during the period of this Agreement;

Control means, in relation to a company or other entity: (i) the legal power to secure directly or indirectly that the affairs of such entity are conducted in accordance with his or its wishes, including to direct or cause the direction of its general management and policies; (ii) the ability to appoint, directly or indirectly, the majority of its directors or executive officers; (iii) the ability to exercise, directly or indirectly, a majority of the votes exercisable at a general meeting; or (iv) the right to receive, directly or indirectly, a majority of the proceeds arising from: (a) any declaration of a dividend; or (b) a distribution arising in the course of winding up, whether solvent or insolvent, or any return of capital to shareholders or members; and the expressions Controlled and Controlling shall be construed accordingly.

Dispute has the meaning specified in clause 12.5.1;

Fee for Services has the meaning specified in clause 2.2;

Force Majeure Event has the meaning specified in clause 14.1;

Party shall mean either the Client or the Consultant and “**Parties**” shall mean both of them;

Products shall mean AAWG and CFP2-LR4;

Rules has the meaning specified in clause 12.5.1;

Services has the meaning specified in clause 2.1.

- 1.2. References to statutory provisions will be construed as references to those provisions as amended or re-enacted or as their application is modified by other provisions from time to time and will include references to any provisions of which they are re-enactments (whether with or without modification).
- 1.3. References to clauses and schedules are references to clauses of and schedules to this Agreement, references to sub clauses are, unless otherwise stated references to sub clauses of the clause in which the reference appears.
- 1.4. Any reference to any agreement or document is a reference to such agreement or document as it may have been or may from time to time be amended, novated, supplemented or replaced by a document having similar effect.
- 1.5. References to the plural include the singular and vice versa.
- 1.6. References to any gender include a reference to all other genders.
- 1.7. References to an individual will include his personal representatives.
- 1.8. The words “including” and “in particular” are to be construed as being by way of illustration or emphasis only and are not to be construed as, nor will they take effect as, limiting the generality of any foregoing words.
- 1.9. The words “other” or “otherwise” are not to be construed as being within the same class or grouping as any foregoing words where a wider construction is appropriate in the context.
- 1.10. The headings and sub headings and any contents page are inserted for convenience only and will not affect the construction of this Agreement.

2. AGREEMENT

- 2.1 After the Commencement Date, if and when requested by the Client, the Consultant shall provide the following services (the “**Services**”) to the Client:
 - Technical support and assistance at Client’s Moscow, Russia facility premises as requested by Client to fix any Moscow facility equipment operation malfunctioning and to ensure reliable manufacturing AAWG and CFP2-LR4 according to the manufacturing capacities of the equipment;
 - Reasonable remote technical support and assistance as requested by Client to fix any Moscow facility equipment operation malfunctioning and to ensure reliable manufacturing AAWG and CFP2-LR4 according to the manufacturing capacities of the equipment.
- 2.2 For the provision of the Services, the Client shall pay the Consultant a fee of either (i) \$9,000.00 United States Dollars (USD) per week for an engineer working to assist Client remotely or (ii) \$15,000.00 USD per week for an engineer if travel is required or (iii) as otherwise agreed between the parties (the “**Fee for Services**”).

3. PERIOD FOR PROVIDING SERVICES

The Consultant shall provide the Services under this Agreement if and when requested by the Client, subject to the termination provisions of this Agreement, for the period from the Commencement Date until 30 September 2019. Any Services provided by the Consultant after such date shall be subject to a separate agreement between the Parties.

4. CONSULTANT UNDERTAKINGS

The Consultant shall ensure that the Services are performed by qualified and trained personnel of the Consultant with reasonable skill, care and diligence to the standards to be expected of a professional Consultant and commensurate with the standards of Consultant’s overall business.

5. TERMINATION DUE TO INSOLVENCY

Either Party may, at any time by notice in writing to the other Party, terminate this Agreement as from the date of service of such notice if the other Party:

- 5.1 suspends or ceases to carry on (or threatens to suspend or cease to carry on) all or a material part of its business;
- 5.2 stops or suspends payment of any of its debts or is unable to, or admits its inability to, pay its debts as they fall due;
- 5.3 has a moratorium declared in respect of any of its indebtedness;

- 5.4 has any action, proceedings, procedure or step taken in relation to the suspension of payments, a moratorium of any indebtedness, winding up, dissolution, administration or reorganisation (using a voluntary arrangement, scheme of arrangement or otherwise);
- 5.5 suffers the appointment of a liquidator, receiver, administrative receiver, administrator, compulsory manager or other similar officer in respect of itself, or
- 5.6 has any event occur in relation to it that is analogous to those set out above in any jurisdiction.

6. TERMINATION FOR CONVENIENCE

The Client may, upon a 1-month written notice, and the Consultant may, upon a 2-month written notice (which notice cannot be sent before the Commencement Date), request the termination of this Agreement for convenience.

7. TERMINATION OR SUSPENSION ON BREACH OF CONTRACT

- 6.1 Either Party may at any time, by notice in writing to the other Party, terminate this Agreement immediately where the other Party commits a material breach of its obligations under this Agreement which is incapable of remedy.
- 6.2 Either Party may, at any time by notice in writing to the other Party, terminate this Agreement where the other Party commits a material breach of any of its obligations in this Agreement and such breach is not remedied within the period agreed between the Parties at the time, but which in any event shall not be greater than 30 days after receipt of the notice.
- 6.3 The Consultant may suspend the provision of Services hereunder by notice in writing to the Client if the Client fails to pay any portion of the Fee for Services which has become due and payable and such failure continues for 30 days or more after the issuance of the relevant invoice (including in the case of the failure of the Parties to execute an act of acceptance with respect to the services for any reason).

8. PAYMENT ON TERMINATION

If this Agreement is terminated for any reason, the Client shall pay to the Consultant the Fee for Services or a pro-rata portion thereof which reflects the Services performed for the Client up to the date of such termination.

9. PAYMENT TERMS

- 9.1 The Consultant will issue invoices to the Client on a monthly basis for the Fee for Services.
- 9.2 The Client shall pay the relevant invoice within fifteen (15) Business Days from the day the invoice is received by the Client. The Client shall not deduct or withhold any amounts in respect of tax from the payment amount of any invoice unless required by applicable law, in which case the Client shall increase the amount payable under the invoice so that the net amount actually received by the Consultant equals the amount it would have received but for such deduction or withholding.
- 9.3 The Client and the Consultant shall execute a respective act of acceptance with regard to the services performed by the Consultant, in form and substance satisfactory to the Client. Notwithstanding the foregoing, failure to execute such act of acceptance shall not relieve the Client of the obligation to pay the relevant invoice as set out in Clause 9.2.

10. LIABILITIES

- 10.1 The Consultant's total liability under this Agreement, howsoever caused, arising out of or in connection with any Services provided under this Agreement shall not exceed the aggregate Fee for Services actually paid by the Client to the Consultant under this Agreement at the time of determination.
- 10.2 Except as set out above, the Consultant shall not be liable for indirect loss howsoever caused.

11. CONFIDENTIALITY

- 11.1 Both Parties shall, at all times during the period of this Agreement and after termination:
 - 11.1.1 keep all Confidential Information confidential and not to disclose any Confidential Information to any other person; and
 - 11.1.2 not use any Confidential Information for any purpose other than the performance of its obligations under this Agreement.
- 11.2 Any Confidential Information may be disclosed by the receiving Party to:
 - 11.2.1 any governmental or other authority or regulatory body; or
 - 11.2.2 any employees, and (when permitted) any agents or sub-contractors of it;but only to such extent as is necessary for the purposes contemplated by this Agreement or as required by law and subject in each case to the relevant Party ensuring that the person in question keeps the same confidential and does not use the same except for the purposes for which the disclosure was made.
- 11.3 Confidential Information shall not include any information that:

- 11.3.1 is, or has at the relevant time come to be, in the public domain other than as a result of disclosure by the receiving Party (or any of its employees, agents or sub-contractors); or
- 11.3.2 is already in, or at any relevant time comes into, the receiving Party's possession free from any obligation of confidentiality as demonstrated by written evidence.
- 11.4 The Parties will keep confidential the contents of this Agreement and the negotiations leading to it and any documents, files and information made available pursuant to it, except insofar as such matters are required to be disclosed by law.

12. AMENDMENTS

Any amendments or additions to this Agreement must be evidenced in writing and signed by the authorised representatives of both Parties.

13. ASSIGNMENT

- 13.1 The Client may assign this Agreement to any third party upon consent of the Consultant; such consent not to be unreasonably withheld or delayed. The Client may assign and/or transfer this Agreement and all rights and obligations of the Client hereunder without the consent of the Consultant to (i) an Affiliate of the Buyer, or (ii) a person or entity acquiring all or substantial all of the assets of the Buyer, whether by sale, acquisition, merger, operation of law or otherwise, provided that in either case such person is not a competitor of the Consultant or its Affiliates (it being understood and agreed that a "competitor" means an entity deemed by the Consultant or its Affiliates to be a threat to its core business (principally outside of the Russian Federation) due to technology, products or related competitive actions or strategies). For the avoidance of doubt, consent of the Consultant shall not be required for such assignment and/or transfer. For the avoidance of doubt, change of Control over the Client shall not affect the rights and obligations of the Parties hereunder provided that the person acquiring Control over the Client is not a competitor of the Consultant or its Affiliates.
- 13.2 Neither Party shall subcontract this Agreement or its obligations under it without the prior written consent of the other Party.

14. FORCE MAJEURE

- 14.1 Neither Party will be liable for any delay in performing or failure to perform any of its obligations under this Agreement caused by events beyond its reasonable control ("**Force Majeure Event**").
- 14.2 The Party claiming the Force Majeure Event will promptly notify the other Party in writing of the reasons for the delay or stoppage (and the likely duration) and will take all reasonable steps to overcome the delay or stoppage.
- 14.3 If the Party claiming the Force Majeure Event has complied with clause 14.2 its performance under this Agreement will be suspended for the period that the Force Majeure Event continues, and the Party will have an extension of time for performance which is reasonable. As regards such delay or stoppage:
 - 14.3.1 either Party may, if the delay or stoppage continues for more than 30 continuous days, terminate this Agreement with immediate effect on giving written notice to the other Party, and neither Party will be liable to the other for such termination; and
 - 14.3.2 the Party claiming the Force Majeure Event will take all necessary steps to bring that event to a close or to find a solution by which this Agreement may be performed despite the Force Majeure Event.

15. NOTICES

- 15.1 Any notice or communication given or in connection with this Agreement will be sent by email and given or sent in writing to:

In the case of Client:

NEOPHOTONICS CORPORATION, LLC

Address: _____

Email: _____

Attention: _____

In the case of the Consultant:

NEOPHOTONICS CORPORATION

2911 Zanker Road

San Jose, CA 95134

United States of America

Email: Legal@neophotonics.com

Attention: General Counsel

- 15.2 Any such notice or other communication will be conclusively deemed to have been given upon the earlier of (a) the time of delivery or (b) if by email, then upon an acknowledgement of receipt of such email.
- 15.3 Any such notice or communication given after 5.00 pm on a Business Day or on a day other than a Business Day will conclusively be deemed to have been received at the start of the next Business Day.

15.4 A Party may change its address and other particulars listed in this clause 15 for the purpose of addressing notices to it by providing the other Party with notice of such change not less than 5 Business Days before such change is to become effective.

16. GENERAL

16.1 It is hereby acknowledged and agreed that nothing in this Agreement will be constituted as giving rise to any relationship of agency or partnership between the Parties. In fulfilling its obligations hereunder, each Party will be acting entirely for its own account.

16.2 The exercise or failure to exercise any right under this Agreement will not, unless otherwise provided, constitute a waiver of that or any other right.

16.3 If any provision of this Agreement is found by any court or administrative body of competent jurisdiction to be invalid or unenforceable, the invalidity or unenforceability of such provision shall not affect the other provisions of this Agreement, and all the other provisions of this Agreement shall remain in full force and effect. The Parties agree to negotiate in good faith to substitute for any invalid or unenforceable provision a valid or enforceable provision which achieves to the greatest extent possible the economic legal and commercial objectives of the invalid or unenforceable provision.

17. COSTS

Each Party will pay its own costs relating to the negotiation, preparation, execution and implementation by it of this Agreement and of each document referred to in it.

18. COUNTERPARTS

This Agreement may be executed in any number of counterparts and this has the same effect as if the signatures on the counterparts were on a single copy of this Agreement.

19. GOVERNING LAW INTERPRETATION

19.1 This Agreement shall be governed by the law of the state of Delaware, USA.

19.2 This Agreement and any disputes or claims arising out of or in connection with its subject matter or formation (including any contractual or non-contractual obligation, dispute, controversy or claim arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination on-contractual disputes or claims), including any question regarding its existence, validity or termination will be referred to and finally resolved by Arbitration Institute of the Stockholm Chamber of Commerce under Arbitration Rules of the Arbitration Institute of the Stockholm Chamber of Commerce (the "**Rules**"). The place of arbitration shall be Stockholm. The arbitration shall be in English. There shall be 3 arbitrators appointed in accordance with the Rules.

IN WITNESS WHEREOF the duly authorised officers of the Parties have signed this Agreement on the day and year first written above.

NEOPHOTONICS CORPORATION, LLC

Signature: _____

Name: _____

Title: General Director

NEOPHOTONICS CORPORATION

Signature: _____

Name: _____

Title: _____

SCHEDULE 11

LIST AND VALUATION OF EQUIPMENT CONSTITUTING EQUIPMENT CONTRIBUTION

№ п/п	Описание	Модель	Дата производства	Рыночная стоимость без НДС	Кол. шт.	Общая сумма
1	Оптический коммутатор среднего размера	86061C	Apr-06	162 467р.	1	162 467р.
2	Климатическая камера	ESZ-2CA	Apr-06	474 324р.	1	474 324р.

3	Шасси оптического инструментального ресивера сканирующей системы SWS с модулями	OWB10002	Apr-06	127 852p.	3	383 556p.
4	Калибратор оборудования	SRM2519	Jun-00	275 469p.	1	275 469p.
5	Плата AT-DIO-32F	AT-DIO-32F	Jun-00	10 541p.	1	10 541p.
6	Плата PCI-GPIB	NI PCI-GPIB NI-488.2	Jun-00	8 899p.	8	71 192p.
7	Перестраиваемый источник лазерного излучения	SWS15101	Jun-00	652 096p.	1	652 096p.
8	Оптический модуль	SWS15102	Sep-07	182 177p.	1	182 177p.
9	Четырехпозиционный контроллер поляризации	SWS15104	Nov-00	211 647p.	1	211 647p.
10	Патчкорд оптический	FC/APC-FC/UPC,SM,Φ3mm, 3M, 2M, 30M	Jan-18	3 690p.	1	3 690p.
11	Адаптер	PA-342-001C-000	Nov-07	1 209p.	2	2 418p.
12	Обдувочный пневмопистолет	DC-10	Nov-07	126p.	2	252p.
13	Настольный видеомикроскоп	FV-210P	Aug-08	11 362p.	6	68 172p.
14	Измеритель вносимого затухания и возвратных потерь с инструментами для настройки	BR5	May-08	302 662p.	1	302 662p.
15	Электрическая отвертка	S-3	Jan-15	1 609p.	1	1 609p.
16	Тестер оптический	BD-281	Aug-09	12 783p.	1	12 783p.
17	Стереомикроскоп	SZ6745-ST1	Aug-08	16 062p.	4	64 248p.
18	Ионный вентилятор	HX-DC011	Aug-00	1 699p.	5	8 495p.
19	Индукционная паяльная станция	Quick203	Jul-16	7 002p.	2	14 004p.
20	Нагревательный столик для пайки	HP-200T	Sep-16	6 377p.	13	82 901p.
21	Установка пульсовой сварки	TM-100P-0215	Jul-16	307 243p.	1	307 243p.
22	Ионный вентилятор	AP.DC2458	Jul-16	5 268p.	2	10 536p.
23	Дозатор паяльной пасты с приспособлением для крепления	7016249	Aug-08	42 065p.	1	42 065p.
24	Динамометрическая отвертка	RTD 15CN	Jul-16	7 154p.	2	14 308p.
25	Устройство для резки с прессом	Neo-018	Aug-08	1 336p.	1	1 336p.
26	Осциллограф со встроенными модулями	86100D	Jul-10	2 142 795p.	3	6 428 385p.
27	Анализатор оптического спектра	AQ6370D	Mar-08	1 359 420p.	3	4 078 260p.
28	Измеритель мощности	PM-1623	Dec-07	67 157p.	2	134 314p.
29	Устройство восстановления данных и тактового сигнала оптических и электрических данных (OE-CDR) с низким джиттером	100G-LR4-OE-CDR-EVB	Mar-17	228 802p.	3	686 406p.
30	Пельтье-термоэлектрический пластинчатый охладитель	CP-200HTTT	Sep-16	32 866p.	7	230 062p.
31	Мультиметр для оптических измерений со встроенным модулем	8163B	Jun-00	285 073p.	1	285 073p.
32	Мультиметр для оптических измерений со встроенным модулем	AQ2211	Sep-11	117 982p.	4	471 928p.
33	Волокно Катушка 10 км	SMF-28e(10KM) G652.D	Dec-07	65 018p.	3	195 054p.
34	Регулируемый оптический аттенуатор	VOA-S-1310-45-FU-FU-M-1	Aug-16	82 875p.	1	82 875p.
35	Полупроводниковый оптический усилитель	HY-SOA-06-FC/APC	Jun-00	22 253p.	1	22 253p.
36	Устройство очистки оптических коннекторов	FCL-B1000	Jul-00	64 306p.	1	64 306p.
37	Термометр контактный	Fluke 52 II	Mar-17	20 929p.	1	20 929p.
38	Термометр для измерения температуры жала паяльника или температуры припоя.	191A	Mar-17	700p.	1	700p.
39	Измеритель оптической мощности	FPM-302	May-10	20 021p.	1	20 021p.
40	Клеевой пистолет	AB-608-60W	Mar-17	473p.	1	473p.
				7 343 789p.		16 081 230p.

SCHEDULE 12

SELLER'S PROTECTION

This Schedule 12 applies to all claims by the Purchasers against the Seller under this Agreement, other than claims excluded from operation of clause 2.6 as indicated therein.

1 Limits on Claims

The Seller shall not be liable for any claim unless and until Completion has occurred.

2 Amounts

(a) The aggregate liability of the Seller for all and any claims under this Agreement is set out in Clause 2.6.

(b)The liability of the Seller in respect of any claim (or several claims in aggregate)for breach of warranties indicated in Schedule 13 shall not arise unless and until the amount of such claim (or several claims in aggregate) exceeds USD 25,000 or its equivalent in any other currency. For the avoidance of doubt, the Seller shall be liable even in the event a single claim does not exceed USD 25,000, but several claims in aggregate exceed such amount. For further avoidance of doubt, if any claim or several claims in aggregate exceed USD 25,000, the Seller shall be liable for the whole amount of claim (claims) and not merely the excess.

(c)For the avoidance of doubt, the Seller shall be liable for all reasonable legal and other professional fees and expenses payable by the Purchaser or the Company in respect of any breach of any warranty indicated in Schedule 13, including to enforce and preserve the rights of the Purchasers in connection with such breach so long as such fees and expenses are within the aggregate limit of liability of the Seller.

3Time

The Seller shall not be liable unless a Purchaser gives a notice in writing specifying full particulars of a claim (including the amount) within 24 months after the Completion Date, provided that any such claim shall (if not previously satisfied, settled or withdrawn) be deemed to have been withdrawn unless legal proceedings in respect of it have been commenced within twelve (12) months of such written notice being given to the Seller.

4Other Exclusions

The Seller shall not be liable:

(a)if a claim would not have arisen but for any changes made after Completion in the accounting bases, policies, practices or treatment of the Company after the Completion;

(b)to the extent that the claim arises or increases because of:

(i).any change in, any law coming into effect after the date of this Agreement (which is not prospectively in force at the date of this Agreement); or

(ii).any increase in the rates of any Taxation, or the imposition of any new Taxation coming into effect after the date of this Agreement (which is not prospectively in force at the date of this Agreement);

(c)which is contingent only, unless and until the contingent liability to which the claim relates becomes an actual liability and is due and payable (but without prejudice to the right of the Purchaser to give a notice of claim related to such liability);

(d)to the extent that the losses in respect of a claim are actually recovered under any policy of insurance, or the matter giving rise to such claim has been compensated without loss to the Purchasers or the Company.

5 Mitigation

Nothing in this Schedule 13 restricts or limits the general obligation of the Purchasers to mitigate any loss or damage which it may incur in consequence of a matter giving rise to a claim under the Seller's Warranties.

SCHEDULE 13

SELLER'S WARRANTIES

1Warranties related to the Seller

(a)The Seller is solvent or able to pay its debts within the meaning of applicable insolvency laws, and has not stopped paying its debts as they fall due and (to the Seller's knowledge) there is no threatened action, suit, investigation or similar proceeding for the dissolution, liquidation, or insolvency of the Seller. The Seller is entering into the Transactions for its own benefit.

(b)There is no statutory basis for the Seller to be obliged to make a decision on its liquidation or bankruptcy or for third parties to apply to a court for the liquidation or bankruptcy of the Seller.

(c)The Seller does not have any Liability to pay any compensation to any broker, finder, or agent with respect to the Transactions for which the Purchaser or the Company could become directly or indirectly liable.

(d)No stamp duty or similar Tax is payable in the jurisdiction of the Seller in connection with the Transactions.

2The Company

- (a)The Company is an entity duly created, formed or organised, validly existing, and in good standing under the laws of the Russian Federation. The particulars of the Company and the Participatory Interest set out in Schedule 1 are complete, true and correct.
- (b)The Company is duly authorised and has the requisite power and authority necessary to conduct its business and is in good standing under the laws of each jurisdiction where such qualification is required.
- (c)The Company has no Subsidiaries, branches or representative offices; and does not control, directly or indirectly, or has any direct or indirect Equity Securities in any person.
- (d)The copies of the Company's Constitutive Documents that were provided to the Purchasers are accurate and complete and reflect all amendments made through the date hereof. The Company's records made available to the Purchasers for review were correct and complete as of the date of such review, no further entries have been made through the date of this Agreement.
- (e)The Register of the participants of the Company is true and accurate.
- (f)The Company is solvent and able to pay its debts within the meaning of applicable insolvency laws, and has not stopped paying its debts as they fall due and there is no threatened action, suit, investigation or similar proceeding for the dissolution, liquidation, or insolvency of the Company.

3Effect of the Transaction

The execution and the delivery of this Agreement and the performance and consummation of the Transactions by the Seller will not:

- (a)breach any Applicable Law or Order to the Company is subject or any provision of its Constitutive Documents;
- (b)breach any Consent by which the Company is bound or to which any of the Company's assets is subject;
- (c)require any Consent to be obtained by or on behalf of the Company; or
- (d)trigger any rights of first refusal, preferential purchase or similar rights with respect to the Company.

4The Participatory Interest

- (a)All of the issued and outstanding participatory interests in the Company (a) have been duly authorised and are validly issued, fully paid, and non-assessable, (b) were issued in compliance with all Applicable Laws, (c) were not issued in breach of any commitments, and (d) are held of record and owned beneficially solely by the Seller. The Company does not have any Commitments outstanding nor has any obligation to issue any Commitments. There are no Contracts with respect to the voting or transfer of the Company's Equity Securities. There are no resolutions on contribution to the assets of the Company that have not been fulfilled (it being understood that the Equipment Contribution and/or the Intellectual Property Contribution might not be completed as of the date of the Agreement but will be completed not later than the Completion Date).
- (b)Other than the Participatory Interest, the Company has not issued any Equity Securities.
- (c)The Seller is the sole legal and beneficial owner of the Participatory Interest free and clear of any Encumbrances, and is entitled to sell, transfer, convey, assign and deliver to Purchaser 1 the full legal and beneficial ownership of Participatory Interest 1, and to Purchaser 2 the full legal and beneficial ownership of Participatory Interest 2, in each case free of any Encumbrances and third party rights.
- (d)Neither the Seller nor the Company has received nor is it aware of any claims from any person with respect to the legal title, other rights including right to demand title to or benefit from, or an Encumbrance over, any or all of the Participatory Interest (whether exercisable now or in the future and whether contingent or not), and to the Seller's knowledge no facts or circumstances exist that may give rise to any of the foregoing.

5Management Accounts

- (a)The management accounts of the Company dated as at 30 September 2018 (the “**Accounts Date**”), a copy of which is attached to the Agreement as Schedule 14 (the “**Management Accounts**”), have been prepared in accordance with applicable accounting standards and fairly present the assets, liabilities (including all reserves, allowances, provisions, liabilities and commitments contingent or otherwise) and the financial position of the Company as of the Accounts Date, and, so far as the Seller is aware, there has been no Material Adverse Effect on the assets, liabilities and financial position (including off-balance sheet transactions) of the Company since the Accounts Date.

(b)The Management Accounts make proper provision or reserve for or, in the case of actual liabilities, properly disclose, note or take into account as at the Accounts Date:

(i)All known liabilities whether actual contingent or disputed;

(ii)all known capital commitments whether actual or contingent;

(iii)all known bad and doubtful debts; and

(iv)all known taxation,

in each case to the extent required by generally accepted accounting practice.

5. Books and Records

So far as the Seller is aware, the information set out in the corporate books of account and all other records of the Company (including without limitation the Management Accounts) is current, complete and accurate in all material respects, without any omission of any material fact, and no material entry has been destroyed or tampered with in such records; all material corporate measures have been duly and formally authorized by appropriate corporate action.

6. Tax Matters

So far as the Seller is aware, the Company

(a)has complied with all material requirements in respect of Tax imposed by Applicable Law;

(b)has duly made within any required time period all necessary declarations and reports to the relevant fiscal body for Taxation, and

(c)has properly and punctually paid all Tax which it has become liable to pay.

7. Ownership of Assets

(a)The Intellectual Property Contribution will be duly completed not later than the Completion Date. So far as the Seller is aware, no Taxes are payable or will be payable by the Company in connection with the Intellectual Property Contribution.

(b)The Company has good and marketable title to and legal and beneficial ownership of all its respective property, free and clear of all liens and encumbrances. The Company has not permitted or created any Encumbrance of any kind over any of the assets.

(c)So far as the Seller is aware, after its entry into the Manufacturing License Agreement, the Company will have valid contractual or legal rights to all objects, facilities, services, properties, assets and intellectual property, free and clear from any Encumbrance except as set out in the Manufacturing License Agreement, necessary for the carrying on of the business of the Company in the manner in which it is presently carried on and for the future production of CFP2– LR4 and AAWG (100 GHz). The Seller has sufficient right, title and authority to grant the rights and/or licenses under the Manufacturing License Agreement to the Company. So far as the Seller is aware, entering into and performing the Manufacturing License Agreement and the provision of respective license to the Company thereunder will not infringe or violate any third party rights, including any third party intellectual property rights.

(d)Not later than the Completion Date, the Company will become the sole valid legal owner of the equipment listed in Schedule 11 to the Agreement pursuant to the Equipment Contribution, free and clear from any Encumbrance.

8. Litigation

(a)The Company is not engaged, whether as claimant, defendant or otherwise, in any legal action, proceeding or litigation which is either in progress or, so far as the Seller is aware, is threatened.

(b)No Governmental Authority is conducting an official investigation or inquiry concerning the Company, or, so far as the Seller is aware, has threatened to do so.

9. Compliance with Laws

So far as the Seller is aware,

(a)The Company is and has been acting in compliance with all material obligations, duties, requirements imposed by Applicable Law and with every order, decree, or resolution by any relevant Governmental Authority which are currently in force and binding upon the Company except for any non-compliance which would not have a Material Adverse Effect with respect to the Company.

(b)The Company has obtained and is currently in possession of all material Consents, permits, licenses and any similar authorizations required under Applicable Law necessary for the operation of its business. Except for any default which would not have a Material Adverse Effect with respect to the Company, the Company is not and has not been in default under any of such Consents, permits, licenses or other similar authority.

10. Employment Matters

(a)The Company is in compliance with all Applicable Laws concerning labour, health and safety laws, regulations regarding employment and employment practices, terms and conditions of employment, wages and hours, and laws and regulations concerning health and safety in the workplace except for any non-compliance which would not have a Material Adverse Effect on the Company.

(b)So far as the Seller is aware, no employment-related complaint or grievance exists.

(c)There are no agreements or other arrangements (binding or otherwise) outstanding or anticipated claims or disputes between the Company and any trade union or other body representing all or any of the employees of the Company.

(d)There are no contracts or arrangements between the Company and any of its employees that contain any unusual or non-market payment conditions or termination provisions other than retention and termination bonuses, the existence of which has been disclosed to the Purchaser. The Company has not issued any options to acquire participatory interest in the Company to its employees.

(e)So far as the Seller is aware, the Company has always timely paid wages and does not owe any debts to its employees in connection with their employment or otherwise except normal accrual through the current date, plus items noted in paragraph 10(d).

11. Insurance Matters

The Company does not have any insurance policies other than insurance policies required by Applicable Law with respect to employees of the Company.

12. Environmental Matters

So far as the Seller is aware, the Company has operated in material compliance with all Applicable Laws concerning the protection of the environment and has not received written notice of any violation of such laws.

SCHEDULE 14

MANAGEMENT ACCOUNTS



**NEOPHOTONICS RUSSIA
SEP-18 USD**

GLOBAL BS DTL			
ACCOUNT DESCRIPTION			
			NEO RUSSIA
			SEP-18
ASSETS			
Cash and Cash Equivalents			
Cash Bank Russia - RUB			117.27
Cash Bank - RUB (Budgeted)			119,561.70
Cash Bank - USD			11,386.53

Total Cash and Cash Equivalents			131,065.50

Inter-Company Receivables			
InterCo Other Receivable			114,139.36
InterCo Other Receivable			15,102.84

Total Inter-Company Receivables			129,242.20

Inventories,Net			
Inventories - Receiving Inventory Account			2,647.13
Inventories - Raw Materials			559,812.93
Inventories - Raw Materials - Org Default			(130.200)
Inventories - WIP			(53.720)
Inventories - WIP - Pull Materials			25.28
Inventories - Finished Goods			242,411.43
Inventories Intercompany - Intransit			26,540.00
Inventories Reserves - RM			(588,841.420)
Inventories Reserves - FG			(242,411.430)

Total Inventories, Net			0.00

Prepaid and Other Current Assets			
Other Receivables – Misc Non AR			21,356.01

Total Prepaid and Other Current Assets			21,356.01

Assets Held for Sale			
Assets-Held-for-Sale			555,463.30
Assets Held For Sale - PP&E - Cost			5,856,803.81
Assets Held For Sale - PP&E - Accum Depr			(3,483,383.230)

Total Assets Held for Sale			2,928,883.88

TOTAL CURRENT ASSETS			3,210,547.59

Property, Plant & Equipment			
Machinery & Equipment - Manufacturing			208,403.04

Total Property, Plant & Equipment			208,403.04

Accumulated Depreciation & Amortization			
Accum Depr - Machinery & Equipment - Manufacturing			(76,414.450)

Total Accumulated Depreciation & Amortization			(76,414.450)

Net Property, Plant & Equipment			131,988.59

TOTAL ASSETS			3,342,536.18

LIABILITIES AND STOCKHOLDER'S EQUITY			
Accounts Payable			
Trade Accounts Payable - Expense			(1,048.660)
Trade Accounts Payable - Expense (Adj)			(150.370)
Accrued Payable – Inventory and Expense (Adj)			(19,922.720)

Total Accounts Payable			(21,121.750)

I/C Accounts Payables			
InterCo Payables			(18,188.400)

Total I/C Accounts Payables			(18,188.400)

Accrued and Other Current Liabilities			
Payroll Payable - Accrued salaries and wages			(1,432.540)
Payroll - Accrued Vacation			(22,000.270)
Accrued Audit and Accounting			(668.400)
Accrued Restructure			(156,883.430)
Accrued Miscellaneous			(24,389.970)

Total Accrued and Other Current Liabilities			(205,374.610)

TOTAL CURRENT LIABILITIES			(244,684.760)

TOTAL LIABILITIES			(244,684.760)

Stockholder's Equity			
Common Stock			
Common Stock - NeoPhotonics Corporation Limited			(21,833.960)

Total Common Stock			(21,833.960)

Additional Paid-In Capital			
Additional paid-in capital			(13,079,318.210)
Additional paid-in-capital non US GAAP (Memo)			(7,565,388.890)
Additional paid-in-capital non US GAAP (Memo-Conta)			7,565,388.89
Additional paid-in capital - Options			(90,621.510)

Total Additional Paid-In Capital			(13,169,939.720)

Accumulated Profit/(Deficit)			
Retained earnings - Prior years			7,880,343.35
Current Year Earnings			2,047,732.32

Total Retained Earnings + Current Year Earning			9,928,075.67

Accumulated Other Comprehensive Income/Loss			
Unrealized Loss From Foreign Currency Translation			
Foreign currency translation adjustments			165,846.59

Total Accumulated Other Comprehensive Income/Loss			165,846.59

Total stockholders' Profit/(Deficit)			(3,097,851.420)

TOTAL LIABILITIES & STOCKHOLDER'S EQUITY			(3,342,536.180)

SIGNATURES TO FRAMEWORK PURCHASE AGREEMENT

JOINT STOCK COMPANY "RUSNANO"

Signature: /s/ Yuri Udaltsov

Name: Yuri Udaltsov

Title: Deputy Chairman of the Management Board of Management Company RUSNANO LLC acting on the basis of a power of attorney

LIMITED LIABILITY COMPANY "RNI"

Signature: /s/ Marianna Peretyanko

Name: Marianna Peretyatko

Title: General Director

NEOPHOTONICS CORPORATION

Signature: /s/ Timothy S. Jenks

Name: Timothy S. Jenks

Title: CEO

NeoPhotonics Confidential

LIST OF SUBSIDIARIES OF NEOPHOTONICS CORPORATION

SUBSIDIARY	JURISDICTION
NeoPhotonics Corporation Limited	Hong Kong
NeoPhotonics (China) Co., Ltd.	People's Republic of China
NeoPhotonics Dongguan Co., Ltd.	People's Republic of China
Novel Centennial Limited	British Virgin Islands
NeoPhotonics Semiconductor, Godo Kaisha	Japan
NeoPhotonics Corporation, LLC	Russia
NeoPhotonics Technics Limited Liability Company	Russia
NeoPhotonics Laser Devices, Inc.	Delaware, United States of America

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-223661, 333-217211, 333-210399, 333-202942, 333-197657, 333-189577, 333-179453, 333-177306, 333-172031 on Form S-8 and Registration Statement No. 333-213967 on Form S-3 of our reports dated March 7, 2019, relating to the consolidated financial statements of NeoPhotonics Corporation and subsidiaries (NeoPhotonics Corporation), and the effectiveness of NeoPhotonics Corporation's internal control over financial reporting, appearing in this Annual Report on Form 10-K of NeoPhotonics Corporation for the year ended December 31, 2018.

/s/ DELOITTE & TOUCHE LLP

San Jose, California
March 7, 2019

CERTIFICATION

I, Timothy S. Jenks, certify that:

1. I have reviewed this Annual Report on Form 10-K of NeoPhotonics Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Registrant as of, and for, the periods presented in this report;
4. The Registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the Registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the Registrant's internal control over financial reporting that occurred during the Registrant's most recent fiscal quarter (the Registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the Registrant's internal control over financial reporting.
5. The Registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Registrant's auditors and the audit committee of the Registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Registrant's internal control over financial reporting.

Date: March 7, 2019

/s/ TIMOTHY S. JENKS

Timothy S. Jenks
President, Chief Executive Officer and
Chairman of the Board of Directors

CERTIFICATION

I, Elizabeth Eby, certify that:

1. I have reviewed this Annual Report on Form 10-K of NeoPhotonics Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Registrant as of, and for, the periods presented in this report;
4. The Registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the Registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the Registrant's internal control over financial reporting that occurred during the Registrant's most recent fiscal quarter (the Registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the Registrant's internal control over financial reporting.
5. The Registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Registrant's auditors and the audit committee of the Registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Registrant's internal control over financial reporting.

Date: March 7, 2019

/S/ ELIZABETH EBY

Elizabeth Eby

Chief Financial Officer and Senior Vice President, Finance

CERTIFICATION

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and Section 1350 of Chapter 63 of Title 18 of the U.S. Code (18 U.S.C. § 1350), Timothy S. Jenks, President, Chief Executive Officer and Chairman of the Board of Directors of NeoPhotonics Corporation (the "Company"), and Elizabeth Eby, Chief Financial Officer and Senior Vice President, Finance of the Company, each hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the period ended December 31, 2018, to which this Certification is attached as Exhibit 32.1 (the "Annual Report") fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act, as amended; and

2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

In Witness Whereof, the undersigned have set their hands hereto as of the 7th day of March, 2019.

/S/ TIMOTHY S. JENKS

Timothy S. Jenks
President, Chief Executive Officer and
Chairman of the Board of Directors

/S/ ELIZABETH EBY

Elizabeth Eby
Chief Financial Officer and Senior Vice President,
Finance

This certification accompanies the Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of NeoPhotonics Corporation under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-K), irrespective of any general incorporation language contained in such filing.
