

**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, 2019**
or

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

For the transition period from _____ to _____
Commission File Number: **001-37771**

Acacia Communications, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

27-0291921
(I.R.S. Employer
Identification No.)

Three Mill and Main Place, Suite 400
Maynard, Massachusetts 01754
(Address of principal executive offices)

(978) 938-4896
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, \$0.0001 par value per share	ACIA	The Nasdaq Global Select Market

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

None
(Title of Class)

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. 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 Securities Exchange Act of 1934 during the preceding 12 months (or 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 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

Accelerated filer

Non-accelerated filer

Smaller reporting company

Emerging growth company

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 Exchange Act). Yes No

The aggregate market value of the voting and non-voting stock held by non-affiliates of the registrant as of June 30, 2019, the last business day of the registrant's most recently completed second fiscal quarter, was approximately \$1,780.5 million. Solely for purposes of this disclosure, shares of common stock held by executive officers and directors of the registrant, and their affiliates, as of such date have been excluded because such persons may be deemed to be affiliates. This determination of executive officers

and directors as affiliates is not necessarily a conclusive determination for any other purposes.

As of February 14, 2020, there were 41,609,041 shares of the Registrant's common stock, \$0.0001 par value, outstanding.

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PART I

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended. All statements other than statements of historical fact contained in this Annual Report on Form 10-K, including statements regarding our future results of operations and financial position, business strategy and plans and objectives of management for future operations, are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important 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.

In some cases, you can identify forward-looking statements by terms such as “may,” “should,” “expects,” “plans,” “anticipates,” “could,” “intends,” “target,” “projects,” “contemplates,” “believes,” “estimates,” “predicts,” “potential,” “will” or “continue” or the negative of these terms or other similar expressions. The forward-looking statements in this Annual Report on Form 10-K are only predictions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. These forward-looking statements speak only as of the date of this Annual Report on Form 10-K and are subject to a number of risks, uncertainties and assumptions described in the section titled “Risk Factors” under Part I, Item 1A below and elsewhere in this Annual Report on Form 10-K. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as indicative of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Some of the key factors that could cause actual results to differ from our expectations include:

- the occurrence of any event, change or other circumstances that could give rise to the termination of the Agreement and Plan of Merger we have entered into with Cisco Systems, Inc. and Amarone Acquisition Corp. and any inability to complete the proposed merger due to the failure to satisfy conditions to completion of the proposed merger, including that a governmental entity may prohibit, delay or refuse to grant approval for the consummation of the proposed merger;
- our ability to sustain or increase revenue from our larger customers, generate revenues from new customers, or offset the discontinuation of concentrated purchases by our larger customers with purchases by new or existing customers;
- our ability to anticipate the timing and scale of demand for our products, including from our largest customers;
- our expectations regarding our expenses and revenue, our ability to maintain and expand gross profit, the sufficiency of our cash resources and needs for additional financing;
- our ability to produce products free of problems, defects, errors and vulnerabilities;
- our anticipated growth strategies;
- our expectations regarding competition;
- the anticipated trends and challenges in our business and the markets in which we operate;
- our expectations regarding, and the capacity and stability of, our supply chain and manufacturing;
- the size and growth of the potential markets for our products and the ability to serve those markets;
- the scope, progress, expansion, and costs of developing and commercializing our products;
- the timing, rate and degree of introducing any of our products into the market and the market acceptance of any of our products;
- our ability to establish and maintain development partnerships;
- our ability to attract or retain key personnel;
- our expectations regarding federal, state and foreign regulatory requirements, including export controls, tax law changes and interpretations, economic sanctions and anti-corruption regulations;
- regulatory or legislative developments in the United States and foreign countries, including trade policy and tariffs and export control laws or regulations that could impede our ability to sell our products to our customer ZTE Kangxun Telecom Co. Ltd. or any of its affiliates, or that could impede our ability to sell our products to

other customers in certain foreign jurisdictions, particularly in China, or that could impede sales by such customers in the United States; and

- our ability to obtain and maintain intellectual property protection for our products.

Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events or otherwise.

Item 1. Business

Overview

Our mission is to deliver high-speed coherent optical interconnect products that transform communications networks, relied upon by cloud infrastructure operators and content and communication service providers, through improvements in performance and capacity and reductions in associated costs. By implementing optical interconnect technology in a silicon-based platform, a process we refer to as the siliconization of optical interconnect, we believe we are leading a disruption that is analogous to the computing industry's integration of multiple functions into a microprocessor. Our products fall into three product groups: embedded modules, pluggable modules and semiconductors. Our embedded module and pluggable module product groups consist of optical interconnect modules with transmission speeds ranging from 100 to 1,200 gigabits per second, or Gbps, for use in long-haul, metro and inter-data center markets. Our semiconductor product group consists of our low-power coherent digital signal processor application-specific integrated circuits, or DSP ASICs, and our silicon photonic integrated circuits, or silicon PICs, which are either integrated into our embedded and pluggable modules or sold to customers on a standalone basis for integration into internally developed or other merchant modules. We are also developing a 400ZR module that will expand our pluggable module product group, and enable inter-data center transmission capacity of 400 Gbps in the same compact pluggable form factors used for 400G client optics, including QSFP-DD and OSFP. Our modules perform a majority of the digital signal processing and optical functions in optical interconnects and offer low power consumption, high density and high speeds at attractive price points. Through the use of standard interfaces, our modules can be easily integrated with customers' network equipment. The advanced software in our modules enables increased configurability and automation, provides insight into network and connection point characteristics and helps identify network performance problems, all of which increase flexibility and reduce operating costs.

Our modules are rooted in our low-power coherent DSP ASICs and/or silicon PICs, which we have specifically developed for our target markets. Our coherent DSP ASICs and silicon PICs are manufactured using complementary metal oxide semiconductor, or CMOS. CMOS is a widely-used and cost-effective semiconductor process technology. Using CMOS to siliconize optical interconnect technology enables us to integrate increasing functionality into our products, benefit from higher yields and reliability associated with CMOS, capitalize on regular improvements in CMOS performance and density, and reduce costs. Our use of CMOS also enables us to use outsourced foundry services rather than requiring custom fabrication to manufacture our products. In addition, our use of CMOS and CMOS-compatible processes enables us to take advantage of the technology, manufacturing and integration improvements driven by other computer and communications markets that rely on CMOS.

Our engineering and management teams have extensive experience in optical systems and networking, digital signal processing, large-scale ASIC design and verification, silicon photonic design and integration, system software development, hardware design and high-speed electronics design. This broad expertise in a range of advanced technologies, methodologies and processes enhances our innovation, design and development capabilities, and has enabled us, and we believe will continue to enable us, to develop and introduce state-of-the-art optical interconnect modules, coherent DSP ASICs and silicon PICs. In the course of our product development cycles, we engage with our customers as they design their current and next-generation network equipment in order to gauge current and future market needs.

We sell our products through a direct sales force to leading network equipment manufacturers, network operators and cloud service providers. Our revenues for the years ended December 31, 2019, 2018 and 2017 were \$464.7 million, \$339.9 million and \$385.2 million, respectively. Our net income for the years ended December 31, 2019, 2018 and 2017 were \$32.8 million, \$4.9 million and \$38.5 million, respectively. As of December 31, 2019, 2018 and 2017, our total assets were \$721.4 million, \$601.9 million and \$611.3 million, respectively.

Proposed Merger with Cisco Systems

On July 8, 2019, we, Cisco Systems, Inc., a California corporation, or the Parent, and Amarone Acquisition Corp., a Delaware corporation and a wholly owned subsidiary of the Parent, or the Merger Sub, entered into an Agreement and Plan of Merger, or the Merger Agreement, pursuant to which, among other things, the Merger Sub will be merged with and into Acacia, which we refer to herein as the Merger, with Acacia surviving the Merger as a wholly owned subsidiary of the Parent. The Merger Agreement was adopted by our stockholders at a special meeting held on September 6, 2019. Completion of the Merger is subject to customary closing conditions, including (i) obtaining certain foreign antitrust approvals, including in China, (ii) the absence of governmental injunctions or other legal restraints prohibiting the Merger or imposing certain antitrust restraints and (iii) the absence of a "Material Adverse Effect," as defined in the Merger Agreement. We and the Parent have already received antitrust clearance for the Merger in the United States, Austria and Germany. If the Merger is completed, each share of our common stock issued and outstanding immediately prior to the effective time of the Merger, subject to certain exceptions, will

be converted into the right to receive \$70.00 in cash. Subject to the satisfaction of these conditions, the parties expect the Merger to close in the second half of the Parent's 2020 fiscal year which ends on July 25, 2020.

For additional information related to the Merger Agreement, we refer you to our Current Report on Form 8-K filed with the Securities and Exchange Commission on July 9, 2019, which includes the full text of the Merger Agreement as Exhibit 2.1.

During the year ended December 31, 2019, we recorded acquisition-related costs of \$7.6 million in sales, general and administrative expenses within our consolidated income statements.

Industry Background

Growing Demand for Bandwidth and Network Capacity

Global Internet Protocol, or IP, traffic is projected to more than triple from 4.1 exabytes per day in 2017 to 13.2 exabytes per day in 2022, representing a projected 26% compound annual growth rate, or CAGR, according to Cisco's Visual Networking Index: Forecast and Trends, 2017-2022, dated February 2019, or the VNI Report. This projected rapid growth in IP traffic is the result of several factors, including:

- **Increased data and video consumption.** Over the last decade, the proliferation of new technologies, applications, Web 2.0-based services and Internet-connected devices has led to increasing levels of Internet traffic and congestion and the need for greater bandwidth. Video traffic, in particular, is growing rapidly, and placing significant strains on network capacity. The VNI Report estimates that by 2022, video traffic will represent 82% of all global consumer IP traffic, forecast to be 293 exabytes per month in 2022, up from 77 exabytes per month in 2017. According to the VNI Report, from 2017 to 2022, video traffic and all global consumer IP traffic are expected to increase by projected 34% and 31% CAGRs, respectively.
- **Growth in mobile and 4G/LTE/5G communications.** The increasing demand for data- and video-intensive content and applications on mobile devices is driving significant growth in mobile data and video traffic and has led to the proliferation of advanced wireless communication technologies, such as 4G/LTE, which depend on wired networks to function. Next generation 5G network build-outs anticipated over the next few years will drive the need for higher capacity optical interfaces in backhaul and metro networks. According to the VNI Report, global mobile data traffic is expected to increase nearly seven-fold from 2017 to 2022, a projected 46% CAGR, reaching 77.5 exabytes per month by 2022.
- **Proliferation of cloud services.** Enterprises are increasingly adopting cloud services to reduce IT costs and enable more flexible operating models. Consumers are increasingly relying on cloud services to satisfy video, audio and photo storage and sharing needs. Together, these factors are driving increased Internet traffic as cloud services are accessed and used. According to the Cisco Global Cloud Index, dated November 2018, or the GCI Report, global cloud data center traffic is expected to reach 19.5 zettabytes, or ZB, per year by 2021, up from 6.0 ZB per year in 2016, a projected 27% CAGR, and to represent 95% of total data center traffic by 2021, compared to 88% in 2016.
- **Changing traffic patterns.** Content service providers and data center operators are increasingly building their own networks of connected data centers to handle the increasing amounts of data generated by today's modern applications that require more complex processing. The architectures of these connected data centers dramatically increase the amount of data being transmitted within these data center networks. For example, virtual assistants like Amazon's Alexa and Apple's Siri require significant processing in the cloud. As a result, the East-West, or E-W, traffic created in response to processing these incoming requests are expected to be greater than the North-South, or N-S, network utilization. As indicated by the GCI Report, it is estimated that by 2021, enterprises will move from an 85/15 mix of N-S/E-W traffic to a 15/85 mix with greater than five times more E-W traffic than that between the servers and the requesting devices, such as desktops, mobile devices and IoT devices, among others.
- **Adoption of the "Internet of Things."** Significant consumer, enterprise and governmental adoption of the "Internet of Things," which refers to the global network of Internet-connected devices embedded with electronics, software and sensors, is anticipated to strain network capacity further and increase demand for bandwidth. The VNI Report estimates that globally, there will be approximately 28.5 billion networked devices in 2022, up from 18 billion such devices in 2017.

Importance of Optical Interconnect Technologies

Optical equipment that interfaces directly with fiber relies on optical interconnect technologies that take digital signals from network equipment, perform signal processing to convert the digital signals to optical signals for transmission over the

fiber network, and then perform the reverse functions on the receive side. These technologies also incorporate advanced signal processing that can monitor, manage and reduce errors and signal impairment in the fiber connection between the transmit and receive sides. Advanced optical interconnect technologies can enhance network performance by improving the capabilities and increasing the capacities of optical equipment and routers and switches, while also reducing operating costs.

The key characteristics of advanced optical interconnect technologies that dictate performance and capacity include:

- **Speed.** Speed refers to the rate at which information can be transmitted over an optical channel and is measured in Gbps.
- **Density.** Density refers to the physical footprint of the optical interconnect technology. Density is primarily a function of the size and power consumption of the technology.
- **Robustness.** Robustness refers to the ability of an optical interconnect technology to compensate for the signal impairment that accumulates through the fiber network and prevent and correct errors introduced by the network.
- **Power Consumption.** Power consumption refers to the amount of electricity an optical interconnect technology consumes. Lower power consumption permits improved density and product reliability, and results in lower operating expense for electricity and cooling.
- **Automation.** Automation refers to the ability of an optical interconnect technology to handle network tasks that historically were required to be performed manually, such as activation and channel provisioning.
- **Manageability.** Manageability refers to the ability of an optical interconnect technology to monitor network performance and detect and address network issues easily and efficiently, which helps increase reliability and reduce ongoing maintenance and operational needs.

As they build their network service offerings, cloud and service providers and network equipment manufacturers weigh these characteristics differently based on the particular demands and challenges they face. For example, cloud or service providers operating long-haul networks that transmit large amounts of data between Boston and San Francisco have relatively few connection points in their networks and may be more sensitive to speed and manageability of the optical interconnect technology and less focused on power consumption. In contrast, metro network operators or cloud or service providers operating inter-city or intra-city networks may face space and power constraints, as well as constantly changing workload needs, and be most focused on density, power consumption and automation.

Improvements in these characteristics can lead to reductions in development costs for network equipment manufacturers, who might otherwise need to develop their own optical interconnect technologies. In addition, improvements in these characteristics can lead to reductions in acquisition and development costs for network equipment manufacturers who incorporate third-party optical interconnect technologies into their equipment, which in turn can reduce capital costs for cloud and service providers. Further, improvements in power consumption, automation and manageability can result in reduced operating costs for cloud and service providers.

Coherent Interconnect Technologies

Traditional techniques for transmitting information via light signals over a fiber optic network used simple “on/off” manipulation, or modulation, of the light signal. These traditional techniques are adequate for transmission speeds up to 10 Gbps, as separate optical equipment can be used to monitor the fiber connection and to compensate for the degradation of the light signals when they travel through the fiber. At transmission speeds in excess of 10 Gbps, however, it becomes increasingly difficult to compensate for the degradation of light signals using traditional techniques. In addition, these traditional techniques require cumbersome and expensive equipment and do not meet network operators’ demands for high-quality signals. In the mid-2000s, advanced modulation techniques enabled by coherent communications techniques and digital signal processing were introduced to increase transmission speeds above 10 Gbps. However, these advanced modulation techniques required significant changes in the underlying optical interconnect technologies and architecture.

Coherent communications is a more complex method of transmitting and receiving information via optical signals. Coherent technologies enable greater utilization of complex formats that manipulate both a signal’s amplitude and its phase to yield a higher data transmission rate with better resilience to signal degradation. Coherent communications enables powerful digital signal processing to counter digitally the effects of signal degradation that were previously managed through an array of discrete components and costly techniques, such as optical dispersion compensation. By taking advantage of coherent communications technologies, some cloud and service providers are able to operate networks at transmission speeds of up to 1,200 Gbps and above. These providers require advanced coherent interconnect solutions.

Digital signal processing in coherent interconnect technologies takes place in an application-specific integrated circuit known as a coherent DSP ASIC. Building a coherent DSP ASIC is a multi-disciplinary undertaking requiring advanced knowledge of several complex technologies, such as optical systems, transmission, communications theory, digital signal processing algorithms and mixed signal design, and the development and verification of complex communications ASICs. To complete an interconnect solution, the coherent DSP ASIC must be used in conjunction with a number of photonic functions, such as modulation and transmission/reception. These functions have traditionally been performed by several discrete, bulky, expensive components that must be purchased by a network equipment manufacturer and designed into custom interface circuit boards before deployment. The development of a photonic integrated circuit, or PIC, enables dramatic improvements in size and cost by tightly integrating multiple photonic functions into a small integrated circuit.

Our Solution—The Siliconization of Optical Interconnect Technology

We have developed several families of high-speed coherent interconnect modules that reduce the complexity, size, power consumption and cost of optical interconnect technology, while simultaneously improving network performance, speed and accelerating the pace of innovation in the optical networking industry. We build these advanced optical interconnect products using silicon, by implementing optical interconnect technology in a silicon-based platform, a process we refer to as the siliconization of optical interconnect. The siliconization of optical interconnect allows us to integrate previously disparate optical functions into a single solution, leading to significant improvements in density and cost and allowing us to benefit from ongoing advances in CMOS. Our optical interconnect solution includes sophisticated modules that perform a majority of the digital signal processing and optical functions required to process network traffic at transmission speeds of 100 Gbps and above in long-haul, metro and inter-data center networks. Our modules meet the needs of cloud and service providers for optical interconnect products in a simple, open, high-performance form factor that can be easily integrated in a cost-effective manner with existing network equipment.

Our optical interconnect products are powered by our internally developed and purpose-built coherent DSP ASICs and/or silicon PICs. Our coherent DSP ASICs and silicon PICs are engineered to work together, and each integrates numerous signal processing and optical functions that together deliver a complete, cost-effective high-speed coherent optical interconnect solution in a small footprint that requires low power and provides significant automation and management capabilities. We believe that our highly integrated optical interconnect modules, which are based on our coherent DSP ASIC and silicon PIC, were, at the time of market introduction, the industry's first interconnect modules to deliver transmission speeds of 100 Gbps and higher. Prior to the introduction of our highly integrated optical interconnect modules, we believe that these transmission speeds were not possible in modules in an industry standard form factor without sacrificing signal quality or other performance characteristics. For example, our CFP- and CFP2-DCO modules, which are based on the industry-standard CFP and CFP2 form factors, enable cloud and service providers to easily upgrade their existing metro and inter-data center networks to 100 Gbps and 200 Gbps using their existing, deployed equipment chassis or newly designed network equipment with CFP slot capabilities. Furthermore, by providing an integrated solution that incorporates digital signal processing and optical functionality required to process and transmit data through a high-speed optical channel, our optical interconnect products reduce the resource requirements of the network equipment manufacturers necessary to build and service equipment with high-speed optical interconnect functionality.

We believe we were the first independent vendor to introduce at commercial scale both a coherent DSP ASIC and a silicon PIC integrated into an optical interconnect module. By designing our silicon PIC in CMOS, which is widely used in the semiconductor industry and generally does not require special packaging, we are able to reduce cost, increase reliability and take advantage of the ongoing improvement of CMOS technology, as well as contract with foundries for the manufacture of many of our products. Our silicon PIC incorporates several key optics functions, including modulation and transmission/reception functions, and supports transmission distances for long-haul, metro and inter-data center applications. We believe that our silicon PIC was the first commercially available PIC to include all of these functions over a broad range of transmission distances. By building both our coherent DSP ASIC and our silicon PIC in CMOS, we can improve the performance and efficiency of the optical interconnect technology and benefit from engineering synergies.

The advantages of our solution include:

- **Industry-leading speed, density and power consumption.** We believe that our coherent DSP ASICs, silicon PICs and 100 to 1,200 Gbps optical interconnect modules consume less power and have higher density than comparable optical interconnect products. Our modules perform functions that have traditionally been provided by several discrete pieces of network equipment.
- **Breadth of integration.** By integrating many photonic functions into our silicon PIC and further integrating our silicon PIC in our modules, we enable simplified network equipment designs and reduce the amount of development

and optical engineering our customers would otherwise do internally, thereby freeing up their engineering resources to focus on other networking functions.

- **Software intelligence.** Our products incorporate software intelligence that automates tasks, such as channel provisioning, and increases manageability through a high level of software features, including increased monitoring and optimization.
- **Cost-efficiency.** We are able to offer our products at attractive price points as a result of the scale and process benefits of our CMOS platforms. In addition, the performance capabilities of our products permit greater flexibility and can reduce both design cost for the network equipment manufacturer and network design and ongoing operational cost for the cloud or service provider.
- **Ease of deployment.** By leveraging industry-standard interfaces, our modules enable cloud and service providers to immediately increase the speed and capacity of their networks by replacing their legacy 10 or 40 Gbps components with our 100 to 1,200 Gbps modules in their existing equipment. Our modules can also easily be deployed in next generation network equipment.

Our Competitive Strengths

Our goal is to maintain and extend our competitive advantages through rapid innovation delivering industry-leading high-speed interconnect products to our customers by focusing on the following key areas:

- **Leading provider of high-speed integrated optical interconnect modules.** We believe we were the first independent vendor to introduce at commercial scale both a coherent DSP ASIC and a silicon PIC integrated into an optical interconnect module capable of transmission speeds of 100 Gbps and above. Our modules solve many of the shortcomings of existing interconnect solutions and meet the majority of a cloud or service provider's interconnect needs in a standard and compact form factor that can be easily integrated with other network equipment. Our coherent DSP ASICs and silicon PICs enable us to offer advanced optical interconnect products with desirable features such as high density, low power and high performance.
- **Track record of rapid innovation driven by advanced design methodologies.** We maximize the pace of innovation through a number of measures, including the creation of an expanding tool box of digital signal processing algorithms, ASIC implementations, CMOS-compatible optics subsystems and related intellectual property, which enable us to develop complex products at a competitive pace by reusing and expanding existing solutions. Our development, verification and test infrastructure and methodologies involve extensive automation, which increase the speed and quality of our development. Our ability to innovate at a rapid pace enables us to offer products purpose-built for different applications and based on the newest CMOS technology. We believe these design, innovation and development capabilities have enabled us, and we believe will continue to enable us, to develop and introduce state-of-the-art optical interconnect modules, coherent DSP ASICs and silicon PICs for use in applications across multiple markets, including long-haul, metro and inter-data center.
- **Leveraging the strength of CMOS for photonics.** The density and cost of high-speed optical interconnect products have traditionally been determined by the photonic components. Implementing the photonic components in CMOS, and using CMOS as the platform for the integration of multiple discrete photonics functions, enables us to significantly reduce the density and cost of our optical interconnect products compared to traditional approaches, which typically rely on complex materials such as lithium niobate, which does not permit the same level of integration, and does not benefit from the ongoing advances in CMOS technology driven by the entire electronics industry.
- **Proprietary software framework enables simplified configuration and deployment.** We have made substantial investments in the software components of our products, which we believe is key to increasing the performance and reducing the capital expenditures and operating expenses associated with high-speed networks. Our software framework also facilitates the integration of the many complex digital signal processing, ASIC, hardware and optical functions required in high-speed interconnect technologies and enables our customers to integrate our products easily into their existing networks. Through the use of software, we are able to configure the same product to be deployed in various network types with different needs and requirements, without the need to modify or reconfigure the network's architecture, providing us with significant development and manufacturing efficiencies.
- **Customer collaboration provides deep understanding of market needs.** We collaborate closely with network equipment manufacturers, as well as directly with many cloud and service providers, and solicit their input as they design their network equipment and as we design our next-generation products. This provides us with deep insights into the current and future needs of our customers and the market, which in turn enables us to develop and deliver products that meet customer demands and anticipate market developments.

- **Strong management and engineering teams with significant industry expertise.** We have deliberately built our management and engineering teams, of which our founders remain a key part, to include personnel with extensive experience in optical systems and networking, digital signal processing, large-scale ASIC design and verification, silicon photonic integration, system software development, hardware design and high-speed electronics design. As of December 31, 2019, approximately 80% of our employees are engineers or have other technical backgrounds, and approximately 50% of our employees hold a Ph.D. or other advanced degree. Each element of our solution is developed by experts in the relevant field. Our collaborative development culture encourages employees with diverse experiences and expertise to work together to create innovative solutions.

Our Strategy

Our goal is to become the leading provider of high-speed interconnect technology that underpins the world's data and communication networks. To grow our business and achieve our mission, we are pursuing the following strategies:

- **Continue to innovate and extend our technology leadership.** Our coherent DSP ASICs and silicon PICs are at the heart of our products' abilities to deliver cost-efficient high performance. We intend to continue to invest in our technology to deliver innovative and high-performance products and to identify and solve challenging interconnect needs. We expect that our continued investments in research and development will enable us to expand and enhance the capabilities of our CMOS-based products in order to continue to develop higher-capacity and higher-density software-enabled products. We are also developing a 400ZR module that will expand our pluggable module product group, and enable inter-data center transmission capacity of 400 Gbps in the same compact pluggable form factors used for 400G client optics, including QSFP-DD and OSFP. We also plan to continue to invest in silicon PIC innovation and its optimization with our coherent DSP ASICs in order to serve the growing demand for bandwidth.
- **Increase penetration within our existing customer base.** We focus heavily on the needs of our customers and frequently innovate in partnership with them to deliver cost-effective products that meet their specific needs. As we continue to enhance and expand our product groups, and as our existing customers seek to expand and improve their network equipment technology, we believe there is potential to generate additional revenue through sales of existing and new products to these customers.
- **Continue to expand customer base.** We believe there continues to be unmet need for high-speed, cost-efficient interconnect products among cloud and service providers. Historically, our sales were primarily to network equipment manufacturers that did not have internally developed coherent DSP ASICs. More recently, we have had success in marketing and selling our products to network equipment manufacturers that have internally developed their own coherent DSP ASICs. We believe that the benefits of our solution, supported by the success of existing customers as references, will drive more network equipment manufacturers to purchase their interconnect products from us. We plan to continue to acquire new customers through expanded sales and marketing and brand recognition efforts.
- **Grow into adjacent markets.** We believe that growth in fiber optics-based communications is likely to accelerate, partly driven by the cost and density advantages of our CMOS solution, and that this growth, together with expansion in other markets that depend on high-speed networking capabilities, as well as adjacent markets, such as access aggregation in 5G, Multi-System Operators and Fiber to the x, and intra-data center networking, will result in demand for additional applications for our existing products, as well as non-coherent products that may leverage our silicon PIC in the future. These adjacent markets often place a greater importance on interoperability standards than traditional telecom applications. The purpose of the 400ZR project at the Optical Internetworking Forum, and parallel efforts at CableLabs and the Institute of Electrical and Electronics Engineers, or IEEE, is to address this need for interoperability and, in some cases, consider additional specifications and requirements of these adjacent market applications. We believe our ability to develop compact, pluggable, low-power optical interconnect products will create further opportunities for us to serve new types of customers, including companies that do not have sufficient optical engineering expertise to develop systems using current interconnect technologies.
- **Selectively pursue investments, acquisitions or other strategic transactions.** Although we are focused on expanding our market share organically, we may pursue investments, acquisitions or other strategic transactions that complement our existing business, represent a strategic fit and are consistent with our overall growth strategy.

Our Products

Our products fall into three product groups: embedded modules, pluggable modules and semiconductors. Our optical interconnect technology products consist of families of high-capability, scalable, cost-efficient optical interconnect modules that are rooted in our coherent DSP ASIC and silicon PIC components. Our embedded module and pluggable module product

groups consist of optical interconnect modules with transmission speeds ranging from 100 to 1,200 Gbps per module for use in long-haul, metro and inter-data center markets. Our module products incorporate our proprietary advanced system-in-a-module software, which, through a standardized interface, enables seamless installation, configuration and operation and a high level of performance monitoring. Our semiconductor product group consists of our low-power coherent DSP ASICs and our silicon PICs, which are either integrated into our embedded and pluggable modules or sold to customers on a standalone basis for integration into internally developed or other merchant modules.

We have developed and manufacture, sell and support the following high-speed coherent interconnect modules and components across three product groups:

Embedded Modules

AC1200 Flex Product Family

Our AC1200 product family, currently ramping in production, utilizes two wavelengths, with up to 600 Gbps capacity each, and supports transmission capacity of up to 1,200 Gbps. Our AC1200 module is software configurable to optimize transmission speeds, fiber capacity, compensation for signal impairment and power consumption for multiple network applications, including inter-data center, metro, long-haul and submarine.

AC400 Flex Product Family

Our AC400 Flex product family supports transmission capacities ranging from 100 to 400 Gbps per module in a 5" x 7" form factor. Modules in our AC400 Flex product family are software configurable to optimize transmission speeds, fiber capacity, compensation for signal impairment and power consumption for multiple network applications, including inter-data center, metro, long-haul and submarine, spanning transmission distances up to 12,000 km and greater.

Pluggable Modules

CFP2-DCO Product Family

Our CFP2-DCO product family supports up to 200 Gbps transmission speeds, using QPSK, 8QAM and 16QAM modulation, over distances of up to 2,500 km in an industry standard CFP2 form factor. The module supports interoperable staircase FEC, as well as Acacia proprietary soft decision FEC, and is mainly used in inter-data center, metro and long-haul network applications.

CFP2-ACO Product Family

Our CFP2-ACO product family supports transmission speeds of up to 200 Gbps over distances of up to 2,500 km using an industry-standard, CFP2 pluggable form factor that was designed in accordance with the Implementation Agreement defined by the Optical Internetworking Forum. This module has an analog electrical interface and a linear optical transmitter and receiver that supports multiple modulation formats and transmission capabilities of 100 and 200 Gbps based on the selected format. Our CFP2-ACO offers an optics-only solution for customers who currently rely on in-house DSP capabilities.

AC100-CFP Product Family

Our AC100-CFP product family supports 100 Gbps transmission speeds over distances of up to 2,500 km in an industry-standard, pluggable CFP form factor. The modules in our AC100-CFP product family utilize our internally developed silicon PIC technology and are mainly used in metro, inter-data center and long-haul network applications.

Semiconductors

DSP ASICs

Our coherent DSP ASICs incorporate our proprietary signal processing algorithms to meet the power and performance requirements of the inter-data center, metro, long-haul and submarine markets. We selectively offer our coherent DSP ASIC as a standalone component to customers designing their own coherent modules and line-cards.

Silicon PICs

Our coherent silicon PICs incorporate multiple coherent optical functions, such as transmission and reception, in a single package. The high level of integration in our silicon PICs enables high density designs of coherent modules and linecards. We selectively offer our silicon PIC as a standalone component to customers for designs that may or may not utilize our DSP

components. We are also working with several client optics vendors that are interested in leveraging our silicon PIC technology in non-coherent 400 Gbps applications that use PAM4 modulation and direct detection.

Sales and Marketing

We currently market and sell our products through a direct sales force consisting of sales personnel and centralized and field-based technical customer support and may in the future market and sell our products through third-party distributors. Our sales force also works closely with our product line management personnel to support strategic sales activities.

Our products typically have a long sales cycle, requiring discussions with prospective customers in order to better understand their network and system level requirements and technology roadmaps. Our customers are predominantly network equipment manufacturers, network operators and cloud service providers and we have discussions with them regarding the requirements of their end customers, which provides our sales force with insight into how our products will be integrated into our customers' solutions and how these systems will be deployed in the networks of their end customers. This sales process requires us to develop strong customer relationships. The period of time from our initial contact with a prospective or current customer to the receipt of purchase orders for high-volume production is frequently a year or more. Prospective customers perform system and network level testing before equipment is deployed in a network carrying live traffic. We perform extensive reliability and verification testing based on industry standards and as further guided by the requirements of our customers. This phase of our sales cycle can take several months and purchase arrangements may not be entered into until after this phase is completed. In addition, once the first purchase order is placed by a customer, it may take several months or longer for that customer to increase the volume of its purchases.

We invest time and resources to meet with leading carriers and cloud service providers to understand network system performance issues. These efforts provide us with a deep understanding of the challenges faced by carriers and cloud service providers which, in turn, enables us to focus our future product and technology development efforts to address those challenges. For example, understanding that several of our customers are planning to adopt technologies that enable up to 1,200 Gbps and higher transmission speeds, we are currently developing products to satisfy these requirements.

Our in-house sales personnel also assist customers with orders, delivery requirements and warranty returns. Our technical support engineers respond to technical and product-related questions, provide simulation tools to enable customers to optimize their optical link design and provide application support to customers who have incorporated our products into their systems. We provide our customers with field-based technical support and centralized technical support. Our field-based technical support is provided on site from our offices in China, Europe and San Jose, California, and our centralized technical support is primarily housed within our corporate headquarters in Maynard, Massachusetts. Our centralized customer support operations allow our technical customer support personnel to work directly with our research and development and operations personnel on critical customer technical support as well as escalated specialized technical support, which reduces the time it takes to identify and address our customers' issues and helps our personnel maintain and improve upon their technical skills.

Customers

The number of customers who have purchased and deployed our products has increased from eight in 2011 to more than 40 during 2019. We have historically generated most of our revenue from a limited number of customers. Our five largest customers, which differed by period, collectively accounted for 81% of our revenue in 2019, 74% of our revenue in 2018 and 70% of our revenue in 2017. In 2019, ZTE Kangxun Telecom Co. Ltd., or ZTE, accounted for 27% of our revenue, Cisco Systems, Inc. and its affiliates, together Cisco, accounted for 17% of our revenue, Infinera Corporation, or Infinera, accounted for 17% of our revenue and ADVA Optical Networking North America, Inc., or ADVA, accounted for 13% of our revenue. In 2018, ZTE accounted for 20% of our revenue, Infinera, which on October 1, 2018 acquired another of our customers, Coriant, Inc. or Coriant, including all 2018 revenue from Infinera and Coriant, accounted for 17% of our revenue, ADVA accounted for 15% of our revenue and Cisco accounted for 14% of our revenue. In 2017, ZTE accounted for 30% of our revenue, ADVA accounted for 15% of our revenue and Coriant accounted for 11% of our revenue.

Manufacturing

We utilize a range of CMOS and CMOS-compatible processes to develop and manufacture the coherent DSP ASICs, silicon PICs and other components that are designed into our modules. We select the semiconductor process and foundry that provides the best combination of performance, cost and feature attributes necessary for our products.

We engage several contract manufacturers and other service providers to test, build and inspect our products that incorporate our coherent DSP ASICs, silicon PICs and other components for high-volume production of our products. These

contract manufacturers and service providers also implement many customer-specific configurations and packaging requirements before shipment to our customers. We build the test systems used in the manufacture of our products. We also directly manufacture prototype products during initial new product introduction. We believe our outsourced manufacturing model enables us to focus our resources and expertise on the design, sale, support and marketing of our products to best meet customer requirements. We also believe that this manufacturing model provides us with the flexibility required to respond to new market opportunities and changes in customer demand, simplifies the scope of our operations and administrative processes and significantly reduces our working capital requirements, while providing the ability to scale production rapidly.

We subject our contract manufacturers, fabrication foundries, suppliers of standard, as well as our custom-designed, components and other service providers to qualification requirements in order to meet the high quality and reliability standards required of our products. Our engineers and supply chain personnel work closely with our contract manufacturers, foundries and other suppliers and service providers to increase yield, reduce manufacturing costs, improve product quality and ensure that component sourcing strategies are in place to support our manufacturing needs.

Research and Development

Our engineering group has extensive experience in optical systems and networking, digital signal processing, ASIC development and design, silicon photonic integration, system software development and high-speed electronics design. As of December 31, 2019, approximately 80% of all our employees are engineers or have other technical backgrounds, and approximately 50% of all our employees hold a Ph.D. or other advanced degree. We utilize our hardware and software expertise to integrate coherent DSP ASICs and silicon PICs into high-speed interconnect products that are compatible with industry-standard form factor, interfaces and power consumption requirements. We participate in industry groups such as Open ROADM, Optical Internetworking Forum, CableLabs and IEEE to help drive the industry towards standardization that allows for the integration of our products into diverse optical systems. In addition, we offer our integration expertise to our customers to help expedite their adoption of new products.

We use simulation tools at many levels of product development, reducing the number of design errors and the need for costly and time consuming development cycles. Our simulation environment makes use of industry standard computer aided design tools as well as models and tools that are developed internally. Our simulation tools also allow us to make efficient tradeoffs between power consumption, size and performance early in the development cycle. We believe this contributes to the ability of our products to deliver superior performance with low power consumption.

Our research and development facilities are located in Maynard, Massachusetts, Holmdel, New Jersey, San Jose, California, Ottawa, Canada, Bengaluru, India and Wooburn Green, United Kingdom. We have devoted approximately 116,000 square feet of space to our research and development facilities, which we expect to increase in the future. Our research and development facilities are equipped with industry standard test equipment, including optical spectrum analyzers, high-speed sampling oscilloscopes, logic analyzers, wafer probes, wafer saws, optical network and Ethernet test sets, thousands of kilometers of optical fiber and associated optical amplifiers and other optical test equipment. We use these facilities to conduct comprehensive testing and validation procedures on internally produced chips, components and products before transferring production to our contract manufacturers for commercial, higher-volume manufacturing.

As research and development is critical to our continuing success, we are committed to maintaining high levels of research and development over the long term. We incurred research and development expenses of \$128.7 million, \$102.4 million and \$92.0 million during the years ended December 31, 2019, 2018 and 2017, respectively.

Intellectual Property

Our success and ability to compete depend substantially upon our core technology and intellectual property rights. We generally rely on patent, trademark and copyright laws, trade secret protection and confidentiality agreements to protect our intellectual property rights. In addition, we generally require employees and consultants to execute appropriate non-disclosure and proprietary rights agreements. These agreements acknowledge our exclusive ownership of intellectual property developed for us and require that all proprietary information remain confidential.

We maintain a program designed to identify technology that is appropriate for patent and trade secret protection, and we file patent applications in the United States and, when appropriate, certain other countries for inventions that we consider significant. As of December 31, 2019, we had 76 patents granted in the United States and seven patents granted in foreign jurisdictions, which expire between 2027 and 2039. We also had 73 patent applications pending in the United States, and 24 pending foreign patent applications. Although our business is not materially dependent upon any one patent, our patent rights and the products made and sold under our patents, taken as a whole, are a significant element of our business. In addition to

patents, we also possess other intellectual property, including trademarks, know-how, trade secrets, design rights and copyrights. We control access to and use of our software, technology and other proprietary information through internal and external controls, including contractual protections with employees, contractors, customers and partners. Our software is protected by U.S. and international copyright, patent and trade secret laws. Despite our efforts to protect our software, technology and other proprietary information, unauthorized parties may still copy or otherwise obtain and use our software, technology and other proprietary information. In addition, we have expanded our international operations, and effective patent, copyright, trademark and trade secret protection may not be available or may be limited in foreign countries.

Companies in the industry in which we operate frequently are sued or receive informal claims of patent infringement or infringement of other intellectual property rights. We have, from time to time, received such claims from companies, including from competitors and customers, some of which have substantially more resources and have been developing relevant technology for much longer than us. As we become more successful, we believe that competitors will be more likely to try to develop products that are similar to ours and that may infringe our proprietary rights. It may also be more likely that competitors or other third parties will claim that our products infringe their proprietary rights. Successful claims of infringement by a third party, if any, could result in significant penalties or injunctions that could prevent us from selling some of our products in certain markets, result in settlements or judgments that require payment of significant royalties or damages or require us to expend time and money to develop non-infringing products. We cannot assure you that we do not currently infringe, or that we will not in the future infringe, upon any third-party patents or other proprietary rights.

Competition

The optical communications markets are highly competitive and rapidly evolving. We compete with domestic and international companies, many of which have substantially greater financial and other resources than we do. We encounter substantial competition in most of our markets, although we believe we have few competitors that compete with us across all our product lines and markets. Our principal competitors in one or more of our product lines or markets include II-VI (formerly Finisar), Fujitsu Optical Components, Inphi, Lumentum Holdings, NEL, Neophotonics and Sumitomo Electric Industries. We also compete with internally developed coherent interconnect solutions of certain network equipment manufacturers, including Ciena, Huawei and Nokia (formerly Alcatel-Lucent). Finally, we face competition from optical interconnect modules that are the result of joint developments among certain of the competitors listed above. Consolidation in the optical systems and components industry has increased in recent years, and future consolidation could further intensify the competitive pressures that we face.

The principal competitive factors upon which we compete include performance, low power consumption, rapid innovation, breadth of product line, availability, product reliability, reputation, level of integration and cost, multi-sourcing and selling price. We believe that we compete effectively by offering high levels of customer value through high speed, high density, low power consumption, broad integration of photonic functions, software intelligence for configuration, control and monitoring, cost-efficiency, ease of deployment and collaborative product design. We cannot be certain we will continue to compete effectively.

We also may face competition from companies that may expand into our industry and introduce additional competitive products. The same standardization that allows for the integration of our products into diverse optical systems carries the side effect of lowering the competitive threshold for new market entrants. Existing and potential customers and strategic partners are also potential competitors. These customers may internally develop or acquire additional competitive products or technologies, selectively, or through consolidation of the companies in our industry, which may cause them to reduce or cease their purchases from us.

Government Regulation

Since our customers operate around the world and we rely primarily upon non-U.S. manufacturers to make our products, our business and our ability to successfully compete for business in our industry is dependent upon global, supply, manufacturing and customer relationships that are affected by the trade and tariff policies of each country in which we operate. Increased tariffs on parts and components imposed by the countries in which our products are manufactured can increase our production costs, and increased tariffs imposed by the countries in which our products are sold can increase the cost of our product to our customers.

Our products and services are subject to export controls, including the U.S. Department of Commerce's Export Administration Regulations and economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls, and similar laws and regulations that apply in other jurisdictions in which we distribute or sell our products and services. Export control and economic sanctions laws and regulations include restrictions and prohibitions on the sale or supply of certain products and services and on our transfer of parts, components, and related technical

information and know-how to certain countries, regions, governments, persons and entities. For example, in April 2018, the U.S. Department of Commerce activated a denial order against ZTE and an affiliated company based on adverse findings relating to the activities covered by ZTE's 2016 settlement with the U.S. Department of Commerce to resolve charges of export control violations by ZTE. This denial order added ZTE and the affiliate to the "Denied Persons List," suspending U.S. export privileges of ZTE and the affiliate, prohibiting them from participating in transactions subject to U.S. Department of Commerce export control regulations, and prohibiting other businesses and individuals, including us, from certain activities in support of ZTE's business. In June 2018, ZTE and the U.S. Department of Commerce reached a new settlement imposing additional penalties and compliance measures upon ZTE, pursuant to which the denial order was terminated and ZTE was removed from the Denied Persons List. Although this further U.S. Department of Commerce action authorized us to resume sales to and related activities involving ZTE, the U.S. Congress or U.S. regulatory authorities may take future legislative or regulatory action that may materially interfere with our ability to make sales to ZTE or others of our customers, particularly in China. In May 2019, the U.S. Department of Commerce designated Huawei Technologies Co. Ltd., or Huawei, and numerous affiliated companies on its "Entity List" upon finding reasonable cause to believe that the companies have been involved in activities contrary to the national security or foreign policy interests of the United States. This designation imposed new requirements for export licenses for exports, reexports, and in-country transfers of any items or technologies subject to the U.S. export control regulations, and requests for licenses are reviewed with a presumption of denial. U.S. regulators are reportedly considering additional measures that may be used to restrict access to U.S. products and technologies by countries such as China and specific companies such as Huawei. Such measures could include extending the extraterritorial reach of U.S. restrictions by reducing the thresholds for applying U.S. regulations to non-U.S.-made items incorporating or derived from U.S. parts, components, software or technologies. U.S. regulators may also impose new restrictions on previously non-controlled emerging or foundational items and technologies for which exports to countries such as China are deemed to present undesirable national security risks. Even without such legislative or regulatory action, we would be prohibited from exporting our products to any foreign recipient if we have knowledge that a violation of U.S. export regulations has occurred, is about to occur, or is intended to occur in connection with the item. Different countries may implement their own export control regulatory systems, which can affect the flow of parts, components, finished products, and related technologies throughout the supply chain to and from suppliers, manufacturers, distributors and customers. In 2019, China published a proposed new comprehensive export control law that would, if adopted, create a system through which China may selectively restrict exports of products and technologies from China, perhaps in response to regulatory actions affecting China that may be imposed by adversary trading partners, such as the United States.

In addition, various countries regulate imports of certain products, through permitting, licensing and transaction review procedures, and may enact laws that could limit our ability to produce or distribute our products or the ability of our customers to produce or distribute the products into which our products are incorporated. The exportation, re-exportation, transfers within foreign countries, and importation of our products and the parts, components and technologies necessary to manufacture our products, including by our partners, must comply with these laws and regulations. Among these regulations are rules in the United States and other countries that prohibit companies such as Huawei from supplying products and services for national 5G telecommunications networks. Pursuant to an executive order issued in May 2019, the U.S. government is developing a new regulatory mechanism through which it may block imports into the United States of certain information and communications products and services designed, developed, manufactured, or supplied by entities owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary, where the transaction presents an undue risk to U.S. information and communications technology or services, critical infrastructure or the digital economy of the United States, or other unacceptable risks to the national security of the United States or the security and safety of United States persons. U.S. government procurement supply chain risk management regulations prohibit U.S. government agencies from directly or indirectly contracting to obtain certain telecommunications and video surveillance equipment, systems or services, produced or performed by certain designated Chinese companies, and this prohibition is expected to be extended to prohibit U.S. government agencies from contracting with entities that use such equipment, systems or services, and to prohibit the use of U.S. government grant or loan proceeds to acquire such equipment, systems or services.

We are also subject to various domestic and international anti-corruption laws, such as the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act, and similar anti-bribery and anti-kickback laws and regulations in other places where we do business. These laws and regulations generally prohibit companies and their intermediaries from offering or making improper payments to governmental, political and certain international organization officials for the purpose of obtaining, retaining or directing business. Our exposure for violating these laws and regulations increases as our international presence expands and as we increase sales and operations in foreign jurisdictions.

In addition, we are subject to, or are expected to facilitate our customers' compliance with, environmental, health and safety laws and regulations in each of the jurisdictions in which we operate or sell our products. These laws and regulations govern, among other things, the handling and disposal of hazardous substances and wastes, employee health and safety and the use of hazardous materials in, and the recycling of, our products.

Employees

As of December 31, 2019, we employed 429 full-time employees, consisting of 219 in research and development, 98 in operations, which includes manufacturing, supply chain, quality control and assurance, 112 in executive, sales, general and administrative, and two part-time employees. We have never had a work stoppage, and none of our employees is represented by a labor organization or under any collective bargaining arrangements. We consider our employee relations to be good.

Our Corporate Information

We were incorporated in the State of Delaware in June 2009. Our principal executive offices are located at Three Mill and Main Place, Suite 400, Maynard, MA 01754, and our telephone number at that address is (978) 938-4896. Our website address is www.acacia-inc.com.

“Acacia Communications®,” “Acacia®,” “Connecting at the Speed of Light®,” our logo, and other trademarks or tradenames of Acacia Communications, Inc. appearing in this Annual Report on Form 10-K are our property. This Annual Report on Form 10-K also contains trademarks and trade names of other companies, which are the property of their respective owners. Solely for convenience, trademarks and trade names referred to in this Annual Report on Form 10-K may appear without the ® or ™ symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the right of the applicable licensor to these trademarks and trade names.

Available Information

We make available free of charge through our website 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 Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the Securities and Exchange Commission, or SEC. We also make available, free of charge on our website, the reports filed with the SEC by our executive officers, directors and 10% stockholders pursuant to Section 16 of the Exchange Act as soon as reasonably practicable after copies of such filings are provided to us by the reporting persons. The information contained on, or that can be accessed through, our website is neither a part of, nor incorporated by reference in this Annual Report on Form 10-K.

Item 1A. Risk Factors

The following risk factors and other information included in this Annual Report on Form 10-K should be carefully considered. These risk factors may be important to understanding other statements in this Annual Report on Form 10-K. The following information should be read in conjunction with Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and related notes in Part II, Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K.

The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known to us or that we presently deem less significant may also impair our business operations. Please see page 1 of this Annual Report on Form 10-K for a discussion of some of the forward-looking statements that are qualified by these risk factors. If any of these risks occurs, our business, financial condition, operating results, cash flow and prospects could be materially and adversely affected.

Because of the following factors, as well as other factors affecting our financial condition and operating results, past financial performance should not be considered to be a reliable indicator of future performance, and investors should not use historical trends to anticipate results or trends in future periods.

Risks Related to the Merger

Our proposed Merger may be delayed or not occur at all for a variety of reasons, including the possibility that the Merger Agreement is terminated prior to the completion of the Merger.

On July 8, 2019, we entered into an Agreement and Plan of Merger, or the Merger Agreement, with Cisco Systems, Inc., a California corporation, or the Parent, and Amarone Acquisition Corp., a Delaware corporation and a wholly owned subsidiary of the Parent, or the Merger Sub. The Merger Agreement provides for the merger of the Merger Sub with and into us, which we refer to herein as the Merger, with us surviving the Merger as a wholly owned subsidiary of the Parent. Completion of the Merger is subject to customary closing conditions, including (i) obtaining certain foreign antitrust approvals, including in China, (ii) the absence of governmental injunctions or other legal restraints prohibiting the Merger or imposing certain antitrust restraints and (iii) the absence of a “Material Adverse Effect,” as defined in the Merger Agreement. In addition, the obligation of each party to consummate the Merger is conditioned upon, among other things, the accuracy of the representations and warranties of the other party (subject to certain materiality exceptions), and material compliance by the other party with its covenants under the Merger Agreement. Therefore, the Merger may not be completed or may not be completed as quickly as expected.

Failure to complete the Merger could adversely affect our business and the market price of our common stock in a number of ways, including:

- the market price of our common stock may decline to the extent that the current market price reflects an assumption that the Merger will be consummated;
- if the Merger Agreement is terminated under certain circumstances specified in the Merger Agreement, we would be required to pay the Parent a termination fee of \$120 million (including under specified circumstances in connection with an alternative acquisition proposal);
- we have incurred, and will continue to incur, significant expenses for professional services in connection with the Merger for which we will have received little or no benefit if the Merger is not consummated; and
- a failed Merger may result in negative publicity and/or give a negative impression of us in the investment community or business community generally.

The Merger could divert management’s attention, disrupt our relationships with third parties and employees and result in negative publicity or legal proceedings, any of which could negatively impact our operating results and ongoing business.

We have expended, and continue to expend, significant management time and resources in an effort to complete the Merger, which may have a negative impact on our ongoing business. Uncertainty regarding the outcome of the Merger and our future could disrupt our business relationships with our existing and potential customers, suppliers, vendors, landlords and other business partners, who may attempt to negotiate changes in existing business relationships or consider entering into business relationships with parties other than us. Uncertainty regarding the outcome of the Merger could also adversely affect our ability to recruit and retain key personnel and other employees. The pendency of the Merger may also result in negative publicity and a negative impression of us in the financial markets, and it has led to, and may result in additional, litigation against us and our directors and officers. Such litigation is distracting to management and has required, and may in the future require, us to incur significant costs. Such litigation could result in the Merger being delayed and/or enjoined by a court of

competent jurisdiction, which could prevent the Merger from becoming effective. The occurrence of any of these events individually or in combination could have a material and adverse effect on our business, financial condition and results of operations.

While the Merger Agreement is in effect, we are subject to restrictions on our business activities.

While the Merger Agreement is in effect, we are subject to restrictions on our business activities and must generally operate our business in the ordinary course, subject to certain exceptions. These restrictions could prevent us from pursuing attractive business opportunities that may arise prior to the consummation of the Merger. Although we may be able to pursue such activities with the Parent's consent, the Parent may not be willing to provide its consent for us to do so.

If the Merger occurs, our stockholders will not be able to participate in any upside to our business.

If the Merger is consummated, our stockholders will receive \$70.00 in cash per share, without interest and subject to applicable tax withholding, of our common stock owned by them, and will not receive any shares of the Parent's common stock. As a result, if our business following the Merger performs well, our current stockholders will not receive any additional consideration and will therefore not receive any benefit from any such future performance of our business.

Litigation could delay and or prevent the Merger from becoming effective or from becoming effective within the expected timeframe.

We and our directors were named as defendants in several lawsuits brought by purported stockholders challenging the Merger and seeking various forms of injunctive and declaratory relief, as well as awards of damages, costs, expert fees and attorneys' fees. While the plaintiffs in these lawsuits have dismissed their claims in exchange for our filing of supplemental disclosure regarding the Merger, which we filed on August 27, 2019, we may be subject to additional future litigation challenging the Merger. One of the conditions to the completion of the Merger is that no injunction by any governmental entity of competent jurisdiction, such as a court, will be in effect that prohibits or makes illegal the consummation of the Merger. As such, if any future plaintiffs are successful in obtaining an injunction prohibiting the consummation of the Merger, then such injunction may prevent the Merger from becoming effective or from becoming effective within the expected timeframe, either of which could substantially harm our business.

Risks Related to Our Business and Industry

We depend on a limited number of customers for a significant percentage of our revenue and the loss or temporary loss of a major customer for any reason could harm our financial condition.

We have historically generated most of our revenue from a limited number of customers. Our five largest customers, which differed by period, collectively accounted for 81% of our revenue in 2019, 74% of our revenue in 2018 and 70% of our revenue in 2017. In 2019, ZTE Kangxun Telecom Co. Ltd., or ZTE, accounted for 27% of our revenue, Cisco Systems, Inc. and its affiliates, together Cisco, accounted for 17% of our revenue, Infinera Corporation, or Infinera, accounted for 17% of our revenue and ADVA Optical Networking North America, Inc., or ADVA, accounted for 13% of our revenue. In 2018, ZTE accounted for 20% of our revenue, Infinera, which on October 1, 2018 acquired another of our customers, Coriant, Inc. or Coriant, including all 2018 revenue from Infinera and Coriant, accounted for 17% of our revenue, ADVA accounted for 15% of our revenue and Cisco accounted for 14% of our revenue. In 2017, ZTE accounted for 30% of our revenue, ADVA accounted for 15% of our revenue and Coriant accounted for 11% of our revenue. As a consequence of the concentrated nature of our customer base, our quarterly revenue and results of operations may fluctuate from quarter to quarter and are difficult to estimate, and any cancellation of orders or any acceleration or delay in anticipated product purchases or the acceptance of shipped products by our larger customers or any government-mandated inability to sell to any of our larger customers could materially affect our revenue and results of operations in any quarterly period.

For example, in April 2018, the U.S. Department of Commerce imposed a seven-year denial of export privileges that prohibited sales of U.S.-regulated commodities, software and technology to ZTE and an affiliated company, or the ZTE Ban, based on adverse findings relating to the activities covered by ZTE's 2016 settlement with the U.S. Department of Commerce to resolve charges of export control violations by ZTE. The ZTE Ban added ZTE and the affiliate to the "Denied Persons List," suspending U.S. export privileges of ZTE and the affiliate, prohibiting them from participating in transactions subject to U.S. Department of Commerce export control regulations, and prohibiting other businesses and individuals, including us, from certain activities in support of ZTE's business. In June 2018, ZTE and the U.S. Department of Commerce reached a new settlement imposing additional penalties and compliance measures upon ZTE, pursuant to which the ZTE Ban was lifted and ZTE was removed from the Denied Persons List. Although this further U.S. Department of Commerce action ended the export control restriction specifically targeting ZTE, any violations by ZTE of the latest settlement may trigger a new, ten-year denial

order. We may suspend our business with ZTE or other customers if we conclude or are notified by the U.S. Department of Commerce that such business presents an unacceptable risk of noncompliance with U.S. regulations, or if we determine that continued business with such customers is not feasible or desirable.

We may be unable to sustain or increase our revenue from our larger customers, grow revenues with new or other existing customers at the rate we anticipate or at all, or offset the discontinuation of concentrated purchases by our larger customers with purchases by new or existing customers. These larger customers may also reduce or discontinue their purchases of our products in the event they transition to internally developed products or determine to divide their purchases of our products between us and a second source. We expect that such concentrated purchases will continue to contribute materially to our revenue for the foreseeable future and that our results of operations may fluctuate materially as a result of such larger customers' buying patterns. For example, one of our larger customers made significant purchases in the first and second quarters of 2019 and had reduced orders in the third quarter of 2019 before returning to a higher level of purchasing in the fourth quarter of 2019. We have experienced similar unevenness in purchases by our larger customers in prior years. Further, the markets our customers sell into may experience slower deployment than anticipated or these customers may lose market share with their end customers. In addition, we have seen, and may in the future see consolidation of our customer base which could result in loss of customers, reduced purchases or may increase the concentration of our customer purchases. The loss or temporary loss of such customers, or a significant delay or reduction in their purchases, could materially harm our business, financial condition, results of operations and prospects.

The future success of our business is substantially dependent on our successful development and release of new products.

The markets for our products are characterized by changes and improvements in existing technologies and the introduction of new technology approaches. The future success of our business will depend in large part upon the continuing relevance of our technological capabilities, our ability to interpret customer and market requirements in advance of product deliveries and our ability to introduce in a timely manner new products that address our customers' requirements for more cost-effective bandwidth solutions. The development of new products is a complex process, and we may experience delays and failures in completing the development, qualification, introduction and volume ramp of new products. Our successful product development depends on a number of factors, including the following:

- the accurate prediction of market requirements, changes in technology and evolving standards;
- the availability of qualified product designers and technologies needed to solve difficult design challenges in a cost-effective, reliable manner;
- our ability to design products that meet customers' cost, size, acceptance and specification criteria and performance requirements, as well as requirements and specifications established by industry groups or standards bodies;
- our ability to manufacture new products with acceptable quality and manufacturing yields in a sufficient quantity to meet customer demand and according to customer needs;
- our ability to offer new products at competitive prices;
- our dependence on suppliers to deliver in a timely manner materials that are critical components of our products;
- our dependence on single-source supplier and the impact of industry-wide component constraints;
- our dependence on third-party manufacturers to successfully manufacture our products in accordance with the specifications that we and our customers require;
- the identification of and entry into new markets for our products;
- the acceptance of our customers' products by the market and the lifecycle of such products; and
- our ability to deliver products in a timely manner within our customers' product planning and deployment cycle.

In general, a new product development effort may last two years or longer, and requires significant investments in engineering hours, third-party development costs, equipment, prototypes and sample materials, as well as sales and marketing expenses, which will not be recouped if the product launch is unsuccessful. We may not be able to design and introduce new products in a timely or cost-efficient manner, and our new products may be costlier to develop, may fail to meet the requirements of the market or our customers, or may be adopted by customers slower than we expect. In that case, we may not reach our expected level of production orders and may lose market share, which could adversely affect our ability to maintain our current revenue levels or resume revenue growth.

The failure to increase sales of our products to our customers and expand our customer base as anticipated could adversely affect our future revenue and business.

We believe that our future success will depend, in part, on our ability to expand sales of our products to our existing customers for use in a customer's existing or new product offerings. Our future success will also depend on our ability to continue to expand our customer base and drive the adoption of our products in adjacent markets. Our efforts to increase product sales to new and existing customers may generate less revenue than anticipated or take longer than anticipated. Further, our customers may elect to develop in-house modules, purchase modules that incorporate our DSP ASICs from alternate sources, or purchase lower-cost components, such as our DSP ASICs or silicon PICs, in place of modules, which could negatively affect our revenue. If we are unable to increase sales to our new and existing customers, expand our customer base or expand into adjacent markets as anticipated, our business, financial condition, results of operations and prospects could be adversely affected.

Product quality problems, defects, errors or vulnerabilities in our products could harm our reputation and adversely affect our business, financial condition, results of operations and prospects.

We produce highly complex products that incorporate advanced technologies and that we believe to be state-of-the-art for our industry. Despite our testing prior to their release, our products may contain undetected defects or errors, including design, contract manufacturing or supplier quality issues, especially when first introduced or when new versions are released. Product defects or errors have in the past and in the future could affect the performance of our products and could delay the development or release of new products or new versions of products. Allegations of unsatisfactory performance could cause us to lose revenue or market share, damage our reputation in the market and with customers, increase our warranty costs and related returns which would negatively impact our gross margins, cause us to incur substantial costs in redesigning the products, cause us to lose significant customers, subject us to liability for damages or divert our resources from other tasks, any one of which could materially adversely affect our business, financial condition, results of operations and prospects. For example, in May 2017, we announced a quality issue at one of our contract manufacturers, which we refer to as the Quality Issue, that affected a portion of the units manufactured by that contract manufacturer over approximately four months and negatively impacted our product performance. This resulted in a charge to the cost of revenue in our consolidated income statement during the second quarter of 2017.

From time to time, we have had to replace certain components of products that we had shipped and provide remediation in response to the discovery of defects or bugs, including deficiencies in components provided by our suppliers and failures in software protocols or defective component batches resulting in reliability issues, in such products, and we may be required to do so in the future. We may also be required to provide full replacements or refunds or extend warranty terms for such defective products. Such remediation could have a material effect on our business, financial condition, results of operations and prospects.

Quality control problems in manufacturing could result in delays in product shipments to customers or in quality problems with our products which could adversely affect our business.

We have and in the future may again experience quality control problems in our manufacturing operations or the manufacturing operations of our contract manufacturers. For example, we experienced product quality control problems in the second quarter of 2017 in connection with the Quality Issue. If we are unable to promptly identify and correct certain quality issues in our products prior to the products' being shipped to customers, failure of our deployed products could cause failures in our customers' products, which could require us to issue a product recall or trigger epidemic failure claims pursuant to our customer contracts, which may require us to indemnify or pay liquidated damages to affected customers, repair or replace damaged products, or discontinue or significantly delay shipments. Quality control problems with materials provided by suppliers may adversely impact our ability to ship our products to customers. Undetected quality problems may prompt unexpected product returns and adversely affect warranty costs. As a result, we could experience a decline in revenue from existing customers or the loss of a customer entirely, or incur additional costs that would adversely affect our gross margins. In addition, even if a problem is identified and corrected at the manufacturing stage, product shipments to our customers could be delayed, which would negatively affect our revenue, competitive position and reputation.

If we fail to accurately predict market requirements or market demand for our products, our business, competitive position and operating results will suffer.

We operate in a dynamic and competitive industry and use significant resources to develop new products for existing and new markets. After we have developed a product, there is no guarantee that our customers will integrate our product into their equipment or devices and, ultimately, bring the equipment and devices incorporating our product to market, including

because we may be considered a sole-source supplier with a relatively limited operating history or, with respect to certain of our products, because we have enabled a second source supplier who may capture market share. In addition, there is no guarantee that cloud, network and communications service providers will ultimately choose to purchase network equipment that incorporates our products. In these situations, we may never produce or deliver significant quantities of our products, even after incurring substantial development expenses. From the time a customer elects to integrate our interconnect technology into their product, it typically takes 18 to 24 months for high-volume production of that product to commence. After volume production begins, we cannot be assured that the equipment or devices incorporating our product will gain market acceptance by network operators.

If we fail to accurately predict and interpret market requirements or market demand for our new products, our business and growth prospects will be harmed. If high-speed networks are deployed to a lesser extent or more slowly than we currently anticipate, we may not realize anticipated benefits from our investments in research and development. For example, starting in 2017 our industry has been experiencing a slowdown in the rate of new network deployments in the China long-haul and metro network markets, which, when combined with weakening prices and excess inventory, has resulted in a corresponding slowdown in the order rate of certain of our Chinese customers. The combined impact of governmental policy and the cyclical nature of a major market has made it difficult to predict demand from Chinese customers. As a result, our business, competitive position, market share and operating results have experienced, and may continue to experience, pressure.

As demand for our products in one market grows, demand in another market may decrease. For example, if we sell our products directly to content providers in addition to network equipment manufacturers, our sales to network equipment manufacturers may decrease due to reduced demand from their customers or due to dissatisfaction by network equipment manufacturers with this change in our business model. Further, the inter-data center market is subject to upgrade cycles and volatility driven by changing priorities. In addition, even in the event of expansion in our markets, we may not experience a corresponding increase in demand for our products or competition may drive pricing pressure. Any reduction in demand in one market that is not offset by an increase in demand in another market could adversely affect our market share or results of operations.

We may not be able to maintain or improve our gross margins.

We may not be able to maintain or improve our gross margins. Factors such as significant decreases in our revenue, slow introductions of new products, our failure to effectively reduce the cost of existing products, our failure to maintain or improve our product mix or pricing, changes in customer demand or share allocation, annual, semi-annual or quarterly price reductions in excess of industry forecasts and pricing discounts required under the terms of our customer contracts, pricing pressure resulting from increased competition, the availability of superior, 'good enough' or lower-cost technologies, market consolidation or the potential for future macroeconomic or market volatility to reduce sales volumes have and may continue to adversely impact our gross margins. Our gross margins could also be adversely affected by unfavorable production yields or variances, increases in or the inability to secure appropriate periodic decreases in costs of components and materials, the timing changes in our inventory, warranty costs and quality-related returns, changes in foreign currency exchange rates, potential inability to reduce manufacturing costs in response to any decrease in our revenue and possible exposure to inventory valuation reserves. Our competitors have a history of reducing their prices to increase or avoid losing market share, and we may have to reduce our prices to continue to effectively compete. If we are unable to maintain or improve our gross margins, our financial results will be adversely affected.

We generate a significant portion of our revenue from international sales and rely on foreign manufacturers to make our products, and therefore are subject to additional risks associated with our international operations.

Since January 1, 2013, we have shipped our products to customers located in 23 foreign countries. In 2019, 2018 and 2017, we derived 85%, 83% and 84%, respectively, of our revenue from sales to customers with ship-to locations outside the United States. A significant portion of our international sales are made to customers with ship-to locations in China. In 2019, 2018 and 2017, we derived 34%, 29% and 39%, respectively, of our revenue from sales to customers with ship-to locations in China. We also work with manufacturing facilities outside of the United States. We have expanded, and in the future may further expand, our international operations to locate additional functions related to the development, manufacturing and sale of our products outside of the United States. Our international operations are subject to inherent risks, and our results of operations could be adversely affected by a variety of factors, many of which are beyond our control, including:

- U.S. or foreign governmental action, such as export control or import restrictions, that could prevent or significantly hinder our ability to sell our products to certain customers or customers in certain foreign jurisdictions or build our products internationally;
- greater difficulty in enforcing contracts and accounts receivable obligations and longer collection periods;

- difficulties in managing and staffing international offices, and the increased travel, infrastructure and legal compliance costs associated with multiple international locations;
- the impact of general economic and political conditions in economies outside the United States, including the uncertainty related to the withdrawal of the United Kingdom from the European Union, commonly known as Brexit, the terms of the post-Brexit relationship between the United Kingdom and the European Union, and heightened economic and political uncertainty within the United Kingdom, and within and among European Union member states;
- tariff and trade barriers, changes in custom and duties requirements or compliance interpretations and other regulatory requirements or contractual limitations on our ability to sell or develop our products in certain foreign markets and our ability to pass through to our customers any tariff or trade costs imposed on our products;
- heightened risk of unfair or corrupt business practices in certain geographies and of improper or fraudulent sales arrangements that may impact financial results and result in restatements of, or irregularities in, financial statements;
- certification requirements;
- greater difficulty documenting and testing our internal controls;
- reduced protection for intellectual property rights in some countries;
- potentially adverse tax consequences, including further reform to the U.S. tax code and international tax rules such as the base erosion and profit shifting initiative;
- the effects of changes in currency exchange rates;
- changes in service provider and government spending patterns;
- social, political and economic instability;
- higher incidence of corruption or unethical business practices that could expose us to liability or damage our reputation; and
- natural disasters, major public health issues, including pandemics, and acts of war or terrorism.

The U.S. Tax Cuts and Jobs Act, or the Tax Act, enacted in December 2017, brings about far-ranging changes to the existing corporate tax system and establishes a quasi-territorial system for taxing foreign-source income of multinational corporations. It is not known what specific additional measures might be proposed or how they would be implemented or enforced, or what effect emerging tax reform or other near-term Congressional action may have on other companies' or our business practices. Further, pending or new legislation or executive action in the United States that could significantly increase our cost of manufacturing and, consequently, adversely affect our business, financial condition or results of operations, may be enacted.

In addition, international customers may also require that we comply with additional testing or customization of our products to conform to local regulations or other standards, including environmental considerations, which could materially increase the costs to sell our products in those markets.

As we continue to operate on an international basis, our success will depend, in large part, on our ability to anticipate and effectively manage these and other risks associated with our international operations. Our failure to manage any of these risks could harm our international operations and reduce our international sales.

Changes in U.S. trade policies could disrupt global supply, manufacturing and customer relationships, which may materially increase costs of components contained in our products, increase our manufacturing costs and make our products more expensive or unavailable in foreign markets.

The current U.S. Administration has made significant changes to U.S. trade policy, including new or increased tariffs on a broad range of goods imported into the United States, particularly from China, with additional tariffs and other actions still under consideration. Since we rely primarily upon non-U.S. manufacturers to make our products, such actions, whether adopted or threatened, and the perceived negative effect of such actions, could have a disproportionate impact on us and make our products more expensive and less competitive in domestic markets. Further, these changes in U.S. trade policy have triggered retaliatory protectionist actions by affected countries, the continuation or expansion of which could restrict our ability to do business in or with affected countries or could prohibit, reduce or discourage purchases of our products by foreign customers, leading to increased costs of components contained in our products, increased costs of manufacturing our products, and higher prices and reduced demand for our products in foreign markets. For example, there are risks that the Chinese government may,

among other things, impose additional or increased tariffs on imports of U.S. goods, require Chinese companies to use more local suppliers, compel companies that do business in China to partner with local companies and provide incentives to government-backed local customers to buy from local suppliers rather than companies like ours. In addition, foreign governments may pursue internal programs and policies to develop domestic technologies that reduce foreign customers' demand for our products. For example, China's Made in China 2025 program aims to build industries in numerous technological sectors, including 5G mobile communications, among others. As a result, risk of doing business in China is likely to increase, if it has not already, including the risk of theft of intellectual property and data and potentially different treatment of foreign owned intellectual property rights and data than that owned or developed in China. Changes in, and responses to, U.S. trade policy could reduce the competitiveness of our products through increased costs and cause our sales and revenues to drop, which could materially and adversely impact our business and results of operations. Moreover, escalating and retaliatory tariffs or other protectionist measures among the U.S. and other countries may depress the overall economic condition of countries in which our customers are located, such as China, which could harm our business.

We are subject to government regulation, including import, export, economic sanctions, privacy, and anti-corruption laws and regulations that may limit our sales opportunities, expose us to liability and increase our costs.

We are subject to those government regulations that relate to various aspects of our business. Government regulations that are applicable to us are increasingly prevalent, continue to evolve and vary from jurisdiction to jurisdiction.

Our products are subject to export controls, including the U.S. Department of Commerce's Export Administration Regulations and economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls, and similar laws and regulations that apply in other jurisdictions in which we distribute or sell our products. Export control and economic sanctions laws and regulations include restrictions and prohibitions on the sale or supply of certain products and on our transfer of parts, components, and related technical information and know-how to certain countries, regions, governments, persons and entities. For example, in April 2018, the U.S. Department of Commerce imposed the ZTE Ban. The ZTE Ban added ZTE and an affiliate to the "Denied Persons List," suspending U.S. export privileges of ZTE and the affiliate, prohibiting them from participating in transactions subject to U.S. Department of Commerce export control regulations, and prohibiting other businesses and individuals, including us, from certain activities in support of ZTE's business. In June 2018, ZTE and the U.S. Department of Commerce reached a new settlement imposing additional penalties and compliance measures upon ZTE, pursuant to which the ZTE Ban was terminated and ZTE was removed from the Denied Persons List. Although this further U.S. Department of Commerce action authorized us to resume sales to and related activities involving ZTE, any violations by ZTE of the latest settlement may trigger a new ten-year denial order. We may suspend our business with ZTE or other customers, suppliers or partners, if we conclude or are notified by the U.S. Department of Commerce that such business presents an unacceptable risk of noncompliance with U.S. regulations, or if we determine that continued business with such customers, suppliers or partners is not feasible or desirable.

The U.S. Congress or U.S. regulatory authorities may take future legislative or regulatory action that may materially interfere with our ability to make sales to ZTE or others of our customers, particularly in China, or that could impede sales by such customers in the United States. For example, in May 2019, the U.S. Department of Commerce designated Huawei Technologies Co. Ltd., or Huawei, and numerous affiliated companies on its "Entity List" upon finding reasonable cause to believe that the companies have been involved in activities contrary to the national security or foreign policy interests of the United States. This designation imposed new requirements for export licenses for exports, reexports, and in-country transfers of any items or technologies subject to the U.S. export control regulations, and requests for licenses are reviewed with a presumption of denial. U.S. regulators are reportedly considering additional measures that may be used to restrict access to U.S. products and technologies by countries such as China and specific companies such as Huawei. Such measures could include extending the extraterritorial reach of U.S. restrictions by reducing the thresholds for applying U.S. regulations to non-U.S.-made items incorporating or derived from U.S. parts, components, software or technologies. U.S. regulators may also impose new restrictions on previously non-controlled emerging or foundational items and technologies for which exports to countries such as China are deemed to present undesirable national security risks.

Even without such action, we would be prohibited from exporting our products to any foreign recipient if we have knowledge that a violation of U.S. export regulations has occurred, is about to occur, or is intended to occur in connection with the item. In addition, our suppliers may restrict our rights to use their components in products destined for end users or end uses that present heightened regulatory or reputational risks, and some customers may decline to purchase our products that contain parts or components from, or that were manufactured by, suppliers and service providers that present heightened regulatory or reputational risks. The loss or temporary loss of customers as a result of such future regulatory or supply chain limitations could materially harm our business, financial condition, results of operations and prospects. Further, our association with such customers could subject us to actual or perceived reputational harm among current or prospective investors in our common stock, suppliers or customers, customers of our customers, other parties doing business with us, or the general public. Any such

reputational harm could result in the loss of investors in our common stock, suppliers or customers, which could harm our business, financial condition, results of operations or prospects.

In addition, various countries regulate imports and exports of certain products, through permitting and licensing requirements, and have enacted laws that could limit our ability to produce and distribute our products. Exports, re-exports, transfers within foreign countries and imports of our products, including by our partners, must comply with these laws and regulations, and any violations may result in reputational harm, government investigations, penalties and/or a denial or curtailment of our ability to export our products. Complying with import, export and sanctions laws for a particular sale may be time consuming, may increase our costs and may result in the delay or loss of sales opportunities. Although we take precautions to prevent our products from being provided in violation of such laws and regulations, if we are found to be in violation of sanctions or export control laws, we and the individuals working for us could incur substantial fines and penalties. Changes in export, sanctions or import laws or regulations may affect whether it is feasible and profitable for us to manufacture our products in and distribute our products from countries that impose regulatory restrictions on the movement of our parts, components, finished products, and related technologies. For example, in December 2019, China published a proposed new, comprehensive export control law that would, if adopted, create a system through which China may selectively restrict exports of products and technologies from China, perhaps in response to regulatory actions affecting China that may be imposed by adversary trading partners such as the United States. Such regulatory changes may also delay the introduction and sale of our products in international markets, cause us to spend resources to seek necessary government authorizations or to develop different versions of our products, or, in some cases, prevent the export or import of our products to certain countries, regions, governments, persons or entities altogether, any of which could adversely affect our business, financial condition and operating results.

New regulations in the United States and other countries that purport to protect national telecommunications systems and infrastructure may reduce the demand for products and services provided by certain of our customers, which may, in turn, reduce the demand for our products. In particular the U.S. government is pressing foreign governments to ban Huawei equipment and services from national 5G network infrastructure. While many countries continue to allow Huawei technologies in 5G network infrastructure, such bans have been implemented in the United States, Australia, Japan and New Zealand, and dozens of other countries have not yet decided.

Pursuant to an executive order issued in May 2019, the U.S. government is developing a new regulatory mechanism through which it may block imports into the United States of certain information and communications products and services designed, developed, manufactured, or supplied by entities owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary, where the transaction presents an undue risk to U.S. information and communications technology or services, critical infrastructure or the digital economy of the United States, or other unacceptable risks to the national security of the United States or the security and safety of United States persons. It is widely expected that these restrictions will be implemented to block Chinese suppliers, such as Huawei, from serving U.S. telecommunications and telecommunications infrastructure markets, but specific targets of these restrictions are not enumerated, and the regulatory procedures have not yet been finalized.

A similar type of supply chain risk regulation has already been imposed in U.S. government contracting regulations, which were revised in August 2019 to prohibit U.S. government agencies from directly or indirectly procuring, or obtaining, or extending or renewing contracts to procure or obtain, certain equipment, systems or services that include, as a substantial or essential component or critical technology, certain equipment or services produced or provided by Huawei or ZTE, or their subsidiaries or affiliates, or, with respect to certain video surveillance and telecommunications equipment or services, produced or performed by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company, or their subsidiaries or affiliates. These restrictions may be extended to target additional suppliers. Future regulations are expected to extend these restrictions to prohibit U.S. government contracts with entities that use the restricted equipment or services and to prohibit recipients of U.S. government grant or loan funding from using such funding for contracts for the restricted equipment or services.

We are required to comply with various data protection laws and regulations in each of the states and countries where we maintain offices or conduct business, including laws and regulations relating to data privacy, security, and breach notification and reporting. These laws and regulations, known as data protection regulations, are complex, frequently conflict with one another, and have become more onerous in recent years. Complying with existing and future regulatory requirements relating to data privacy, security and breach response could cause us to incur substantial expenses and may require us to change our business practices in a manner that could harm our business and any non-compliance may result in lawsuits, regulatory fines, or other actions or liability. Our business may also be harmed if these privacy-related laws or any newly adopted privacy-related laws are interpreted or implemented in a manner that is inconsistent among different states and countries or inconsistent with our current policies and practices, or those of our customers, suppliers, or other business partners. If we or our suppliers fail to comply with such laws or regulations, we could face sanctions for such noncompliance, and our customers may refuse to

purchase our products, which would have a material adverse effect on our business, financial condition and results of operations.

We are also subject to various domestic and international anti-corruption laws, such as the U.S. Foreign Corrupt Practices Act and the U.K. Bribery Act, as well as other similar anti-bribery and anti-kickback laws and regulations. These laws and regulations generally prohibit companies and their intermediaries from offering or making improper payments to non-U.S. officials for the purpose of obtaining, retaining or directing business. Our exposure for violating these laws and regulations increases as our international presence expands and as we increase sales and operations in foreign jurisdictions.

The markets in which we operate are highly competitive.

The market for high-speed optical interconnect technology is highly competitive. We are aware of a number of companies that have developed or are developing coherent DSP ASICs, coherent and non-coherent PICs, 100 to 1,200 Gbps and above modules and indium phosphide based optics, among other technologies, that compete directly with some or all of our current and proposed product offerings.

Competitors may be able to more quickly and effectively:

- develop or respond either directly or in partnership with other market participants to new technologies or technical standards;
- react to changing customer requirements and expectations;
- devote needed resources to the development, production, promotion and sale of products;
- attain high manufacturing yields on new product designs;
- establish and take advantage of operations in lower-cost regions;
- bring relevant products to the market or enable their customers to bring relevant products to the market through a faster integration cycle; and
- deliver competitive products, including products incorporating our DSP ASICs and PICs, at lower prices, with lower gross margins or at lower costs than our products.

In order to expand market acceptance of our products, we must differentiate our products from those of our competition while continuing to meet the changing needs of our customers. We cannot provide assurance that we will be successful in making this differentiation or increasing acceptance of our products as we have limited resources dedicated to marketing of our products. In addition, we may take other steps to expand market acceptance of our products, including through strategic transactions or otherwise, which steps may not be successful and may lead to a decrease in our revenues either in the short-term or long-term. The same standardization that allows for the integration of our products into diverse optical systems carries the side effect of lowering the competitive threshold for new market entrants. Established companies in related industries or newly funded companies targeting markets we serve, such as semiconductor manufacturers and data communications providers, may also have significantly more resources than we do and may in the future develop and offer competing products. Further, companies that have historically been competitors or industry participants on the component level have in the past and may continue to establish joint ventures or other strategic partnerships to compete with our products. All of these risks may be increased if the market were to further consolidate through mergers or other business combinations between our competitors or if more capital is invested in the market to create additional competitors.

We may not be able to compete successfully with our competitors and aggressive competition in the market may result in lower prices for our products and/or decreased gross margins. New technology and investments from existing competitors and competitive threats from newly funded companies may erode our technology and product advantages and slow our overall growth and profitability. Any such development could have a material adverse effect on our business, financial condition and results of operations.

Our sales cycles can be long and unpredictable, and our sales efforts require considerable effort and expense. As a result, our sales and revenue are difficult to predict and may vary substantially from period to period, which may cause our results of operations to fluctuate significantly.

The timing of our sales and revenue recognition is difficult to predict because of the length and unpredictability of our products' sales cycles. A sales cycle is the period between initial contact with a prospective network equipment manufacturer customer and any sale of our products. Customer orders are complex and difficult to complete because prospective customers

generally consider a number of factors over an extended period of time before committing to purchase the products we sell. Customers often view the purchase of our products as a significant and strategic decision and require considerable time to evaluate, test and qualify our products prior to making a purchase decision and placing an order. The length of time that customers devote to their evaluation, contract negotiation and budgeting processes varies significantly. Our products' sales cycles can be lengthy in certain cases. During the sales cycle, we expend significant time and money on sales and marketing activities and make investments in evaluation equipment, all of which lower our operating margins, particularly if no sale occurs or if the sale is delayed as a result of extended qualification processes or delays from our customers' customers. Even if a customer decides to purchase our products, there are many factors affecting the timing of our recognition of revenue, which makes our revenue difficult to forecast. For example, there may be unexpected delays in a customer's internal procurement processes.

Even after a customer makes a purchase, there may be circumstances or terms relating to the purchase that delay our ability to recognize revenue from that purchase. For example, recognizing revenue from the sale of our products may be subject to delivery to the customer or their carrier or the products may be placed into a remote stocking location. In addition, the significance and timing of our product enhancements, and the introduction of new or similar products by our competitors, may also affect customers' purchases both in the short-term and long-term. Further, our customers' solutions often require components from other optical providers and any inability by those providers to ship products or maintain continuity of supply could have an impact on the sales of our customers, which impact could pass through to us. For all of these reasons, it is difficult to predict whether a sale will be completed, the particular period in which a sale will be completed or the period in which revenue from a sale will be recognized. If our sales cycles lengthen, our revenue could be lower than expected, which would have an adverse effect on our business, financial condition, results of operations and prospects.

The industry in which we operate is volatile and subject to significant cyclicality.

Industries focused on semiconductor and optical network technologies can be volatile and highly cyclical. The markets are characterized by constant and rapid technological change and price erosion, increasing effects of competition, and frequent new product introductions and technology displacement, including those driven by fragmented and proprietary system designs. The industries are further impacted by evolving technical standards, short product life cycles both for semiconductors and optical technologies and for many of the end products in which they are used, and changes in end market demand, as the industry has recently experienced across China, as well as within inter-data center and metro markets. In addition, product demand in the markets in which we compete is tied to the aggregate capital expenditures of telecommunications and network and content service providers as they build out and upgrade their network infrastructure. Capital expenditures can be highly cyclical due to the importance and focus of local initiatives, such as the ongoing telecommunications build out and upgrade in China and the expansion of the inter-data center market, government funding and other factors, thus resulting in wide fluctuations in product supply and demand. From time to time, these factors, together with changes in general economic conditions, have caused significant industry upturns and downturns that have had a direct impact on the financial stability of our customers, their customers and our suppliers. Periods of industry downturns have been characterized by diminished demand for products, unanticipated declines in telecommunications and communications system capital expenditures, industry consolidation, excess capacity compared to demand, high inventory levels and periods of inventory adjustment, under-utilization of manufacturing capacity, changes in revenue mix and erosion of average selling prices, any of which could result in an adverse effect on our business, financial condition and results of operations. We expect our business to continue to be subject to cyclical downturns, such as the one that began in 2017 in China, even when overall economic conditions are relatively stable. To the extent we cannot offset recessionary periods or periods of reduced growth that may occur in the industry or in our target markets in particular through increased market share or otherwise, our business can be adversely affected, revenue may decline and our financial condition and results of operations may be harmed. In addition, in any future economic downturn or periods of inflationary increase we may be unable to reduce our costs quickly enough to maintain profitability levels.

If we fail to attract, retain and motivate key personnel our business could suffer.

Our business depends on the services of highly qualified employees in a variety of disciplines, including optical systems and networking, digital signal processing, large-scale ASIC design and verification, mixed-signal ASIC design, silicon photonic integration, system software development, hardware design and high-speed electronics design. Our success depends on the skills, experience and performance of these employees and members of our senior management team, as well as our ability to attract and retain other highly qualified management and technical personnel. There is intense competition for qualified personnel in our industry and a limited number of qualified personnel with expertise in the areas that are relevant to our business, and as a result we may not be able to attract and retain the personnel necessary for the expansion and success of our business. All of our founders are currently employees of our company. The loss of services of any of our founders, other

members of our senior management team or key personnel, or our inability to continue to attract qualified personnel, could have a material adverse effect on our business.

Customer requirements for new products, as well as specifications established by industry groups and standards bodies, are increasingly challenging, which could lead to significant executional risk in designing such products or make our products obsolete. We may incur significant expenses long before we can recognize revenue from new products, if at all, due to the costs and length of research, development and manufacturing process cycles.

Network equipment manufacturers seek increased performance optical interconnect products, at lower prices and in smaller and lower-power designs. These requirements can be technically challenging, and are sometimes customer-specific, which can require numerous design iterations. Because of the increasing level of complexity of design requirements, including stringent customer-imposed acceptance criteria and specifications established by industry groups or standards bodies, executing on our product development goals is difficult and sometimes unpredictable. These difficulties could result in product sampling delays and/or missing targets on key specifications and customer requirements and acceptance criteria. Our failure to meet our customers' requirements could result in our customers seeking alternative suppliers, which would adversely affect our reputation and results of operations.

We design our products to conform to regulations established by governments and to standards set by industry groups and standards bodies worldwide. Various industry groups are currently considering whether and to what extent to create standards applicable to our current products or those under development. 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, or if our customers prefer a proprietary solution, we may have to make significant expenditures to develop new products. If our customers adopt new or competing industry standards with which our products are not compatible, or industry groups adopt standards or governments issue regulations with which our products are not compatible, our existing products would become less desirable to our customers and our net revenues and results of operations would suffer.

Additionally, we and our competitors often incur significant research and development and sales and marketing costs for products that, at the earliest, 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 depend on third parties for a significant portion of the fabrication, assembly and testing of our products.

The fabrication, assembly and testing of our products is done by third-party contract manufacturers, foundries and other service providers. As a result, we face competition for manufacturing capacity in the open market. We rely on foundries to manufacture wafers and on third-party contract manufacturers to assemble, test and manufacture substantially all of our coherent DSP ASICs, silicon PICs, modules and other components. Our contract manufacturers, foundries and other service providers implement any customer-specific configurations and packaging before customer shipments. Accordingly, we cannot directly control our product delivery schedules and quality assurance. This lack of control has in the past and in the future could result in product shortages or quality assurance problems. For example, we experienced product shortages in the second quarter of 2017 in connection with the Quality Issue. These issues have in the past and in the future could delay shipments of our products, increase our assembly or testing costs or lead to costly epidemic failure claims. In addition, the consolidation of contract manufacturers and foundries, as well as the increasing capital intensity and complexity associated with fabrication in smaller process geometries, has limited the number of available contract manufacturers and foundries and increased our dependence on a smaller number of contract manufacturers and foundries. The limited number of contract manufacturers or foundries could also increase the costs of components or manufacturing and adversely affect our results of operations, including our gross margins. In addition, to the extent we engage additional contract manufacturers or foundries, introduce new products with new manufacturers or foundries, move existing production lines to new manufacturers or foundries and/or vertically integrate processes by assuming new responsibilities internally, we could experience supply disruptions during the transition process.

Because we rely on third-party contract manufacturers, foundries and other service providers, we face several significant risks in addition to those discussed above, including:

- a lack of guaranteed supply of manufactured wafers and other raw and finished components and incorporated products and potential higher wafer, component and incorporated product prices due to limited and, at times, single-source, suppliers and industry-wide component constraints;
- the limited availability of, or potential delays in obtaining access to, key process and leading edge technologies;

- the location of contract manufacturers, foundries and other service providers in regions that are subject to earthquakes, typhoons, tsunamis and other natural disasters;
- the location of contract manufacturers, foundries and other service providers in regions that are and historically have been disproportionately impacted by major public health issues, such as the ongoing outbreak of the novel coronavirus 2019-nCoV, referred to as the Covid-19 Coronavirus Epidemic, or Covid-19;
- competition with our contract manufacturers', foundries' and other service providers' other customers for allocated capacity or supply during periods of capacity constraint or supply shortages; and
- potential regulatory changes, including in the United States, that could in the future prohibit, or increase our costs relating to, the use of contract manufacturers, foundries and other service providers in certain regions.

The manufacture of our products is a highly complex and technologically demanding process that utilizes many state of the art manufacturing processes and specialized components. Our foundries, suppliers, and contract manufacturers have from time to time experienced lower than anticipated manufacturing yields for our wafers or PIC components and modules. This often occurs during the production or assembly of new products or the installation and start-up of new process technologies and can occur even in mature processes due to break downs in mechanical systems, process controls, clean room controls, equipment failures, environmental controls and conditions, calibration errors and the handling of the material from station to station as well as damage resulting from the shipment and handling of the products to various points of processing and from changes to and turnover of trained personnel that assemble, test and package our products.

We depend on a limited number of suppliers, some of which are sole sources, and our business could be disrupted if they are unable to meet our needs.

We depend on a limited number of suppliers of the key materials, including silicon wafers, substrate materials and components, equipment used to manufacture and test our products, and key design tools used in the design, testing and manufacturing of our products. Some of these suppliers are sole sources and in certain instances we face capacity competition from some of our suppliers. With some of these suppliers, we do not have long-term agreements and instead purchase materials and equipment through a purchase order process. As a result, these suppliers may stop supplying us materials and equipment, limit the allocation of supply and equipment to us due to increased industry demand or significantly increase their prices at any time with little or no advance notice. Our reliance on sole source suppliers or a limited number of suppliers could result in delivery problems, reduced control over product pricing and quality, and our inability to identify and qualify another supplier in a timely manner. Some of our suppliers may experience quality, manufacturing or financial difficulties that could cause them to terminate development efforts related to, or prevent them from supplying to us in desired quantities, or at all, materials, or equipment used in, the design and manufacture of our products. In addition, our suppliers, including our sole source suppliers, may experience manufacturing delays or shut downs due to circumstances beyond their control such as labor issues, political unrest, natural disasters or major public health issues, such as the Covid-19 outbreak. Our suppliers, including our sole source suppliers, could also determine to discontinue the manufacture of materials, components, equipment or tools that may be difficult for us to obtain from alternative sources. In addition, the suppliers of design tools that we rely on may not maintain or advance the capabilities of their tools in a manner sufficient to meet the technological requirements for us to design advanced products or provide such tools to us at reasonable prices. Further, the industry in which our suppliers operate is subject to a trend of consolidation. To the extent this trend continues, we may become dependent on even fewer suppliers to meet our material and equipment needs. In the event we need to establish relationships with additional suppliers, doing so may be a time-consuming process and require that we agree to terms, including on costs, that are less favorable to us, and there are no assurances that we would be able to enter into necessary arrangements with these additional suppliers in time to avoid supply constraints in sole sourced components.

Any supply deficiencies or industry allocation shortages relating to the materials, equipment or tools we use to design and manufacture our products could materially and adversely affect our ability to fulfill customer orders and our results of operations. Lead times for the purchase of certain materials, equipment and tools from suppliers have increased and in some instances, have exceeded the lead times provided to us by our customers. In some cases, these lead time increases have limited our ability to respond to or meet customer demand. We have in the past and may in the future, experience delays or reductions in supply shipments, which could reduce our revenue and profitability. In addition, potential regulatory changes, including in the United States, could in the future prohibit, or increase our costs relating to, the use of suppliers in certain regions. If key components or materials are unavailable, our costs would increase and our revenue would decline.

We may not be able to manufacture our products in volumes or at times sufficient to meet customer demands, which could result in delayed or lost revenue and harm to our reputation.

Given the high level of sophisticated functionality embedded in our products, our manufacturing processes are complex and often involve more than one manufacturer. This complexity may result in lower manufacturing yields and may make it more difficult for our current and future contract manufacturers to scale to higher production volumes. If we are unable to manufacture our products in volumes or at times sufficient to meet demand, our customers could postpone or cancel orders or seek alternative suppliers for these products, or lower cost, easier to manufacture competitive products, which would harm our reputation and adversely affect our results of operations.

If our customers do not qualify our manufacturing lines or the manufacturing lines of our subcontractors for volume shipments, our operating results could suffer.

Our manufacturing lines have passed our qualification standards, as well as our technical standards. However, our customers may also require that our manufacturing lines pass their specific qualification standards and that we, and any subcontractors that we may use, be registered under international quality standards. In addition, many of our customers require that we maintain our ISO certification. In the event we are unable to maintain process controls required to maintain ISO certification, or in the event we fail to pass the ISO certification audit for any reason, we could lose our ISO certification. In addition, we may encounter quality control issues in the future as a result of relocating our manufacturing lines or ramping new products to full volume production. We may be unable to obtain customer qualification of our or our subcontractors' manufacturing lines or we may experience delays in obtaining customer qualification of our or our subcontractors' manufacturing lines. Such delays or failure to obtain qualifications would harm our operating results and customer relationships. If we introduce new contract manufacturers and move any production lines from existing internal or external facilities, the new production lines will likely need to be re-qualified with our customers. Any delay in the qualification of our or our subcontractors' manufacturing lines may adversely affect our operations and financial results. Any delay in the qualification or requalification of our or our subcontractors' manufacturing lines may delay the manufacturing of our products or require us to divert resources away from other areas of our business, which could adversely affect our operations and financial results.

Our results of operations may suffer if we do not effectively manage our inventory, and we may continue to incur inventory-related charges.

We need to manage our inventory of component parts and finished goods effectively to meet changing customer requirements. Accurately forecasting customers' product needs is difficult. Our product demand forecasts are based on multiple assumptions, each of which may introduce error into our estimates. In the event we overestimate customer demand, we may allocate resources to manufacturing products that we may not be able to sell. As a result, we could hold excess or obsolete inventory, which would reduce our profit margins and adversely affect our financial results. Conversely, if we underestimate customer demand or if sufficient manufacturing capacity or critical components are unavailable, we could forego revenue opportunities, lose market share and damage our customer relationships.

Also, due to our industry's use of inventory management techniques, such as direct order fulfillment, to reduce inventory levels and the period of time inventory is held, any disruption in the supply chain could lead to more immediate shortages in product or component supply. Additionally, any enterprise system failures, including implementing new systems or upgrading existing systems that help us manage our financial, purchasing, inventory, sales, invoicing and product return functions, could harm our ability to fulfill orders and interrupt other billing and logistical processes.

Some of our products and supplies have in the past, and may in the future, become obsolete or be deemed excess while in inventory due to rapidly changing customer specifications, changes to product structure, components or bills of material as a result of engineering changes, or a decrease in customer demand. We also have exposure to contractual liabilities to our contract manufacturers for inventories purchased by them on our behalf, based on our forecasted requirements, which may become excess or obsolete. Our inventory balances also represent an investment of cash. To the extent our inventory turns are slower than we anticipate based on historical practice, our cash conversion cycle extends and more of our cash remains invested in working capital. If we are not able to manage our inventory effectively, we may need to write down the value of some of our existing inventory or write off non-saleable or obsolete inventory. We have from time to time incurred significant inventory-related charges and taken excess or obsolete inventory from our contract manufacturers. Incurring any such charges or taking any such inventory in future periods could materially and adversely affect our results of operations.

Certain of our customers may require that we ship our finished products to a central location, which is not controlled by us. If that facility is damaged, or if our relationship with that facility deteriorates, we may suffer losses or be forced to find an alternate facility. In addition, revenue is only recognized once our customers take delivery of the products from this location, rather than when we ship them, which could have an adverse effect on our results of operations. We often lack insight into when customers will take delivery of our products, making it difficult to forecast our revenue.

Our operating history makes it difficult to evaluate our current business and future prospects and may increase the risk associated with investments by investors in our common stock.

We were founded in 2009 and shipped our first products in 2011. Our relatively limited operating history, combined with the rapidly evolving, complex, cyclical and competitive nature and consolidation of our industry, suppliers, manufacturers and customers, make it difficult to evaluate our current business and future prospects. We have encountered and may continue to encounter risks and difficulties frequently experienced by companies in constantly evolving, complex industries, including unpredictable and volatile revenues and increased expenses as we seek to grow our business. If we do not manage these risks and overcome these difficulties successfully, our business, financial condition, results of operations and prospects could be adversely affected, and the market price of our common stock could decline. Further, we have limited historic financial data, and we operate in a rapidly evolving and increasingly competitive market. As such, any predictions about our future revenue and expenses may not be as accurate as they would be if we had a longer operating history or operated in a more predictable market.

Since we began commercial shipments of our products, our revenue, gross profit and results of operations have varied 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. It is difficult for us to accurately forecast our future revenue and gross profit and plan expenses accordingly and, therefore, it is difficult for us to predict our future results of operations.

Our revenue growth rate in prior periods is not likely to be indicative of our future growth or performance.

Our revenue growth rate in prior periods is not likely to be indicative of our future growth or performance. During 2019 and 2016, we experienced revenue growth rates of 37% and 100%, respectively, as compared to the immediately preceding annual period. Conversely, during 2018 and 2017 our revenue declined 12% and 19%, respectively, as compared to the immediately preceding annual period. The revenue growth rates we experienced in 2019 and 2016 are not likely to be repeated in future periods. Our revenue for any prior annual period should not be relied upon as any indication of our future revenue or revenue growth. If we are unable to maintain consistent revenue or revenue growth, our business, financial condition, results of operations and prospects could be materially adversely affected.

We have had a history of operating losses, and we may not maintain or increase our profitability.

Although we were profitable in the years ended December 31, 2014 through 2017 and in the year ended December 31, 2019, we incurred operating losses in 2009 through 2013 and again in 2018. We may not be able to sustain or increase profitability on a quarterly or annual basis and have experienced variability on a quarter to quarter basis. If we are unable to sustain or increase profitability, the market value of our stock may decline, and investors in our common stock could lose all or a part of their investment.

We may not be able to successfully manage our business if we are unable to improve our internal systems, processes and controls.

In order to effectively manage our operations and any future growth, we need to continue to improve our internal systems, processes and controls. We may not be able to successfully implement improvements to these systems, processes and controls in an efficient, cost effective or timely manner. In addition, our systems and processes may not prevent or detect all errors, omissions or fraud. We may experience difficulties in managing improvements to our systems or processes and controls, which could impair our ability to provide products to our customers in a timely manner, causing us to lose customers, limit us to smaller deployments of our products or increase our technical support costs.

If we do not effectively expand and train our direct sales force, we may be unable to add new customers or increase sales to our existing customers, and our business will be adversely affected.

We depend on our direct sales force to increase sales with existing customers and to obtain new customers. As such, we have invested and will continue to invest in our sales organization. In recent periods, we have been adding personnel and other resources to our sales function as we focus on growing our business, entering new markets and increasing our market share, and we expect to incur additional expenses in expanding our sales personnel in order to achieve revenue growth. There is significant competition for sales and sales operations personnel with the skills and technical knowledge that we require. Our ability to achieve significant revenue growth will depend, in large part, on our success in recruiting, training, retaining and integrating sufficient numbers of sales personnel to support our growth, particularly in international markets. New hires require significant training and may take significant time before they achieve full productivity. Additional personnel may not become productive as quickly as we expect, and we may be unable to hire, retain or integrate into our corporate culture sufficient

numbers of qualified individuals in the markets where we do business or plan to do business. If we are unable to hire, integrate and train a sufficient number of effective sales personnel, or the sales personnel we hire are not successful in increasing sales to our existing customer base or obtaining new customers, our business, financial condition, results of operations and prospects will be adversely affected.

Most of our long-term customer contracts do not commit customers to specified purchase commitments, and our customers may decrease, cancel or delay their purchases at any time with little or no advance notice to us.

Most of our customers purchase our products pursuant to individual purchase orders or contracts that do not contain purchase commitments. Although some of our customers have committed, subject to agreed upon terms and conditions, including reschedule and cancellation rights, to purchase a specified share of their required volume for a particular product from us, monitoring and enforcing these commitments can be difficult. Some customers provide us with their expected, non-binding forecasts for our products several months in advance, but customers may decrease, cancel or delay purchase orders already in place, and the impact of any such actions may be intensified given our dependence on a small number of large customers. If any of our major customers decrease, stop or delay purchasing our products, or change the mix of our products that they are purchasing, for any reason, our business and results of operations would be harmed. For example, one of our larger customers provided a non-binding forecast for 2018, but actual orders were approximately 40% lower than the forecasted amount. Also, several of our customers have historically experienced period-to-period demand variability or elected to defer purchases scheduled for the fourth quarter into the first quarter of the following year, resulting in a decrease in our anticipated revenue during the fourth quarter. Our customers often lack visibility to end customer demand, and in the event that any of our customers lose significant market share with one or more end customers, those losses could pass through to us and materially and adversely affect our results of operations. Cancellation or delays of such orders may cause us to fail to achieve our short-term and long-term financial and operating goals and result in excess and obsolete inventory.

Acquisitions or other strategic transactions that we may pursue in the future, whether or not consummated, could result in operating and financial difficulties.

We may in the future acquire businesses or assets or engage in other strategic transactions in an effort to increase our growth, enhance our ability to compete, complement our product offerings, enter new and adjacent markets, obtain access to additional technical resources, enhance our intellectual property rights, expand market acceptance of our products or pursue other competitive opportunities. If we seek acquisitions, we may not be able to identify suitable acquisition candidates at prices we consider appropriate. We are in an industry that is actively consolidating and, as a result, there is no guarantee that we will successfully and satisfactorily bid against third parties, including competitors, if we identify a target we seek to acquire.

We cannot readily predict the timing or size of our future acquisitions or other strategic transactions, or the success of such acquisitions or transactions. Failure to successfully execute on any future acquisition or other strategic transactions could have a material adverse effect on our business, prospects, financial condition and results of operations.

To the extent that we consummate acquisitions, we may face financial risks as a result, including increased costs associated with merged or acquired operations, increased indebtedness, economic dilution to gross and operating profit and earnings per share, or unanticipated costs and liabilities, including the impairment of assets and expenses associated with restructuring costs and reserves, the failure to realize expected synergies and unforeseen accounting charges. We would also face operational risks, such as difficulties in integrating the operations, retention of key personnel and our ability to maintain and support products of the acquired businesses, disrupting their or our ongoing business, increasing the complexity of our business, failing to successfully further develop the combined, acquired or remaining technology, and impairing management resources and management's relationships with employees and customers as a result of changes in their ownership and management. Further, the evaluation and negotiation of potential acquisitions, as well as the integration of an acquired business, may divert management time and other resources.

If we are unable to successfully carry out any future acquisition or other strategic transaction, our business, financial condition and prospects for growth could suffer. In addition, we may not realize the benefits of any future acquisition or other strategic transaction to the extent anticipated and the perception of the effectiveness of our management team and our company may suffer in the marketplace. Further, even if we are able to achieve the long-term benefits associated with any future acquisition or other strategic transaction, our short-term financial conditions may be materially and adversely affected.

We may need additional equity, debt or other financing in the future, which we may not be able to obtain on acceptable terms, or at all, and any additional financing may result in restrictions on our operations or substantial dilution to our stockholders.

We may need to raise funds in the future, for example, to develop new technologies, expand our business or acquire complementary businesses. We may try to raise additional funds through public or private financings, strategic relationships or other arrangements. Our ability to obtain debt or equity funding will depend on a number of factors, including market conditions, interest rates, our operating performance and investor interest. Additional funding may not be available to us on acceptable terms or at all. If adequate funding is not available, we may be required to reduce expenditures, including curtailing our growth strategies and reducing our product development efforts, or forgo acquisition opportunities. If we succeed in raising additional funds through the issuance of equity or convertible securities, then the issuance could result in substantial dilution to existing stockholders. If we raise additional funds through the issuance of debt securities or preferred stock, these new securities would have rights, preferences and privileges senior to those of the holders of our common stock. In addition, any preferred equity issuance or debt financing that we may obtain in the future could have restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities, including potential acquisitions.

If our estimates or judgments relating to our critical accounting policies are based on assumptions that change or prove to be incorrect, our results of operations could fall below expectations of securities analysts and investors, resulting in a decline in the market price of our stock.

The preparation of our consolidated financial statements in conformity with accounting principles generally accepted in the United States of America, or GAAP, requires management to make estimates and assumptions that affect the amounts reported in our consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, as described in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” in this Annual Report on Form 10-K, the results of which form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses that are not readily apparent from other sources. Significant assumptions and estimates used in preparing our consolidated financial statements include those related to revenue recognition, stock-based compensation, inventories and the related contract manufacturing liabilities and income taxes. If our assumptions change or if actual circumstances differ from those in our assumptions, our results of operations may be adversely affected and may fall below the expectations of securities analysts and investors, resulting in a decline in the market price of our stock.

We may face product liability and other types of claims, which could be expensive and time consuming and result in substantial damages to us and increases in our insurance rates.

Despite quality assurance measures, defects may occur in our products. The occurrence of any defects in our products could give rise to product liability or epidemic failure claims, which could divert management’s attention from our core business, be expensive to defend, result in the loss of key customer contracts and result in sizable damage awards against us and, depending on the nature or scope of any network outage caused by a defect in or epidemic failure related to our products, could also harm our reputation. Our current insurance coverage may not be sufficient to cover these claims. Moreover, in the future, we may not be able to obtain insurance in amount or scope sufficient to provide us with adequate coverage against potential liabilities. Any product liability claims brought against us, with or without merit, could increase our product liability insurance rates or prevent us from securing continuing coverage, could harm our reputation in the industry and reduce product sales. We would need to pay any product losses in excess of our insurance coverage out of cash reserves, harming our financial condition and adversely affecting our financial performance and operating results.

In addition, we have also been forced to expend significant resources in the defense of the matters brought against us as described in Part I, Item 3 “Legal Proceedings” in this Annual Report on Form 10-K, and we may need to continue to do so in the future. Class action, derivative lawsuits and other securities or other litigation, whether successful or not, could result in substantial costs, damage, indemnification or settlement awards and divert management’s attention and resources from running our business, which could materially harm our reputation, financial condition and results of operations.

Our business and operating results may be adversely affected by natural disasters, major public health issues, including pandemics, or other catastrophic events beyond our control.

Our internal manufacturing headquarters and new product introduction labs, design facilities, assembly and test facilities, and supply chain, and those of our contract manufacturers, are subject to risks associated with natural disasters, such as earthquakes, fires, tsunami, typhoons, volcanic activity, floods and major public health issues, including pandemics, as well as other events beyond our control such as power loss, facilities structural damage, telecommunications failures and uncertainties arising out of terrorist attacks in the United States and armed conflicts or terrorist attacks overseas. The majority of our semiconductor products are currently fabricated and assembled in China, Japan, Singapore and Taiwan. The majority of the internal and outsourced assembly and test facilities we utilize or plan to utilize are located in China and Thailand. Several

of these regions have been identified by the World Health Organization as experiencing ongoing transmission of the Covid-19 outbreak. Additionally, some of our internal design, assembly and test facilities are located in California (design only), New Jersey and Massachusetts, regions with severe weather activity and, in the case of California, above average seismic activity. Further, our research and development personnel are concentrated primarily in our headquarters in Maynard, Massachusetts and in our research center in Holmdel, New Jersey. Any catastrophic loss or significant disruption or damage to any of these facilities or to any facilities that we use in the future would likely disrupt our operations, delay production, and adversely affect our product development schedules, shipments and revenue. For example, as a result of the extension of the lunar new year holidays due to the recent outbreak of Covid-19, shipments of certain supplies and components used by our contract manufacturers in the manufacturer of our products and the operations of our contract manufacturers and other suppliers have been and may continue to be disrupted which could result in delayed shipment of certain of our products to our customers. In addition, any such catastrophic loss or significant damage could result in significant expense to repair or replace the facility and could significantly curtail our research and development efforts in a particular product area or primary market, which could have a material adverse effect on our operations and operating results.

Breaches, failures or interruptions of our cybersecurity systems could degrade our ability to conduct our business operations and deliver products to our customers, compromise the integrity of the software embedded in our products, result in significant data losses and the theft of our intellectual property, damage our reputation, expose us to liability to third parties and require us to incur significant additional costs to maintain the security of our networks and data.

We increasingly depend upon our information technology, or IT, systems to conduct virtually all of our business operations, ranging from our internal operations and product development and manufacturing activities to our marketing and sales efforts and communications with our customers and business partners. Computer programmers may attempt to penetrate our network security, or that of our website and email services, and misappropriate our proprietary information, provide false or misleading instructions to our personnel, embed malicious code in our products or cause interruptions of our service. Because the techniques used by such computer programmers to access or sabotage networks change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques. In addition, sophisticated hardware and operating system software and applications that we produce or procure from third parties may contain defects in design or manufacture, including “bugs” and other problems that could unexpectedly interfere with the operation of the system. We have also outsourced a number of our business functions to third-party contractors, including our manufacturers and logistics providers, and our business operations also depend, in part, on the success of our contractors’ own cybersecurity measures and adherence to their contractual obligations to us, including in connection with their use of and access to our systems. Additionally, we depend upon our employees, customers, suppliers, manufacturers, contractors and other third parties, or our related parties, to appropriately handle confidential data and deploy our IT resources in a safe and secure fashion that does not expose our network systems to security breaches and the loss of data. Data may be accessed or modified improperly as a result of related party theft, error or malfeasance and third parties may attempt to fraudulently induce our related parties into disclosing sensitive information such as user names, passwords or other information in order to gain access to our data or IT systems or our related parties’ data or IT systems. Accordingly, if our cybersecurity systems and those of our related parties fail to protect against unauthorized access, sophisticated cyberattacks and the mishandling of data by our related parties, our ability to conduct our business effectively could be damaged in a number of ways, including:

- sensitive data regarding our related parties or business, including intellectual property and other proprietary data, could be stolen;
- our electronic communications systems, including email and other methods, could be disrupted, and our ability to conduct our business operations could be seriously damaged until such systems can be restored;
- our ability to process customer orders and deliver products could be degraded or disrupted, resulting in delays in revenue recognition; and
- defects and security vulnerabilities could be introduced into the software embedded in or used in the development of our products, thereby damaging the reputation and perceived reliability and security of our products.

The steps we have taken to protect our intellectual property rights and data may be inadequate to protect such assets from disclosure or theft by third parties. If unauthorized disclosure or theft were to occur, we might not be able to prevent others from using what we regard as our intellectual property and data to compete with us. Existing trade secret, copyright, patent and trademark laws offer only limited protection. In addition, the laws of some foreign countries do not protect our intellectual property rights and data or allow enforcement of confidentiality covenants to the same extent as the laws of the United States. For example, doing business in China poses risks, including but not limited to, theft of intellectual property and data and potentially different treatment of foreign owned intellectual property rights and data than that owned or developed in China. If we have to resort to legal proceedings to enforce our intellectual property rights or protect our data, the proceedings could be burdensome, protracted and expensive and could involve a high degree of risk and be unsuccessful.

Should any of the above events occur, we could be subject to significant claims for liability from our customers and regulatory actions from governmental agencies, including sanctions and civil or criminal penalties. In addition, our ability to protect our intellectual property rights could be compromised and our reputation and competitive position could be significantly harmed. Additionally, we could incur significant costs in order to upgrade our cybersecurity systems and remediate damages. Consequently, our competitive position, reputation, financial performance and results of operations could be adversely affected.

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 operations and our products are subject to a variety of environmental, health and safety laws and regulations in each of the jurisdictions in which we operate or sell our products. These laws and regulations govern, among other things, the handling and disposal of hazardous substances and wastes, employee health and safety and the use of hazardous materials in, and the recycling of, our products. Failure to comply with present and future environmental, health or safety requirements, or the identification of contamination, could cause us to incur substantial costs, monetary fines, civil or criminal penalties and curtailment of operations. In addition, these laws and regulations have increasingly become more stringent over time. The identification of presently unidentified environmental conditions, more vigorous enforcement of current environmental, health and safety requirements by regulatory agencies, the enactment of more stringent laws and regulations or other unanticipated events could restrict our ability to use or expand our facilities, require us to incur additional expenses or require us to modify our manufacturing processes or the contents of our products, which could have a material adverse effect on our business, financial condition and results of operations.

If we do not achieve the anticipated financial, operational and effective tax rate efficiencies expected from our corporate tax structure, our financial condition and results of operations could be adversely affected.

In 2015, we implemented a reorganization of our corporate structure and intercompany relationships to more closely align our corporate structure with the international nature of our business activities. This corporate restructuring has allowed us to achieve financial and operational efficiencies and to reduce our overall effective tax rate through changes in our international procurement, manufacturing and sales operations, and in the ways we develop, own and use certain intellectual property. This corporate restructuring has also allowed us to achieve financial and operational efficiencies.

The Tax Act, enacted in December 2017, makes far-ranging changes to the existing U.S. corporate tax system. This legislation establishes a quasi-territorial system for taxing foreign-source income of multinational corporations and, among other items, made changes to the rules governing taxable and tax-free cross-border transfers of intangible property. Certain changes to the U.S. corporate tax system resulting from the Tax Act, mainly that foreign earnings are no longer deferred but are currently subject to U.S. taxes, have, and are expected to continue to, negatively affect the financial, operational and effective tax rate efficiencies of this corporate restructuring.

We cannot provide assurance that these tax benefits and operational efficiencies will continue into future periods. Our efforts in connection with this corporate restructuring have required and will continue to require us to incur expenses for which we may not realize related benefits. If any of the tax benefits are challenged by the applicable taxing authorities upon audit or if there are adverse changes in domestic or international tax laws, including any legislation enacted in pursuance of the Base Erosion and Profit Shifting Initiative, described below, our results of operations may be negatively affected. In addition, if we do not operate our business in a manner that is consistent with this corporate restructuring or any applicable tax laws, we may fail to achieve the financial, operational and effective tax rate efficiencies that we anticipate and our results of operations may be negatively affected.

The implementation of our corporate restructuring increases the likelihood that unfavorable tax law changes, unfavorable government review of our tax returns, changes in our geographic earnings mix or imposition of withholding taxes on repatriated earnings could have an adverse effect on our effective tax rate and our operating results.

We have expanded and may continue to expand our operations into multiple non-U.S. jurisdictions in connection with our 2015 corporate restructuring, including those having tax rates higher and lower than those we are subject to in the United States. As a result, our effective tax rate will be influenced by the amounts of income and expense attributed to each such jurisdiction, which is materially affected by our valuation and pricing of intercompany transactions, both of which can be based on significant management assumptions or estimates. If such amounts were to change so as to increase the amounts of our net income subject to taxation in higher tax jurisdictions, or if we were to commence operations in jurisdictions assessing relatively higher tax rates, our effective tax rate could be adversely affected. As a result of our corporate restructuring, we will be subject to periodic audits or other reviews by tax authorities in the jurisdictions in which we conduct our activities in the future and

there is a risk that the tax authorities could challenge our tax positions, including the assumptions and estimates on which we base the valuation and pricing of intercompany transactions.

The Tax Act establishes a quasi-territorial system for taxing foreign-source income of multinational corporations and other tax proposals are being considered by legislative bodies in some of the foreign jurisdictions in which we operate that could negatively affect our effective tax rate and other tax liabilities.

We cannot predict the form or timing of potential legislative changes, but any newly enacted tax law could have a material adverse impact on our tax provision, net income and cash flows. This could result in additional tax liabilities or other adjustments to our historical results.

The final determination of our income tax liability may be materially different from our income tax provision.

The final determination of our income tax liability, which includes the impact of our corporate restructuring, may be materially different from our income tax provision. We are subject to income taxes in the United States and, as a result of our corporate restructuring, have become subject to income taxes in international jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes. In the ordinary course of our business, there are some transactions where the ultimate tax determination is uncertain. Additionally, our calculations of income taxes are based on our interpretations of applicable tax laws in the jurisdictions in which we file or will file as a result of the implemented corporate restructuring. Although we believe our tax estimates, which include the impact of anticipated tax benefits in connection with our corporate restructuring, are and will be appropriate, the ultimate tax outcome may materially differ from the tax amounts recorded in our consolidated financial statements and may materially affect our income tax provision, net income or cash flows in the period or periods for which such determination is made.

We are also subject to periodic examination of our income tax returns by the Internal Revenue Service, or IRS, in the United States and will be subject to periodic examination of our income tax and other returns by taxing authorities in other tax jurisdictions. For example, we have been selected for examination by the IRS for our 2014 through 2017 income tax years, by the State of New Jersey for income tax years 2015 through 2017 and by the Commonwealth of Massachusetts for sales and use tax years 2016 through 2018. We assess and will continue to assess on a regular basis the likelihood of adverse outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. The outcomes from these examinations may have an adverse effect on our operating results and financial condition.

Furthermore, our provision for income tax could increase as we further expand our international operations, adopt new products or undertake intercompany transactions in light of acquisitions, changing tax laws, expiring rulings and our current and anticipated business and operational requirements.

Our ability to utilize certain net operating loss carryforwards and tax credit carryforwards may be limited under Sections 382 and 383 of the Internal Revenue Code.

As of December 31, 2019, we had net operating loss carryforward amounts, or NOLs, of approximately \$42.4 million and \$117.1 million for U.S. federal and state income tax purposes, respectively, and research and development and other credit carryforward amounts of approximately \$17.3 million, \$21.7 million and \$1.3 million for U.S. federal, state and foreign income tax purposes, respectively. The state net operating loss carryforwards and portions of the federal net operating loss carryforward will expire at various dates beginning in 2029 through 2039. Federal net operating loss carryforwards generated after December 31, 2017 are subject to carryforward indefinitely. The federal and state tax credit carryforwards will expire at various dates beginning in 2020 through 2039 and \$0.7 million of such carryforwards will expire between 2020 and 2022 if not used. Utilization of these net operating loss and tax credit carryforward amounts could be subject to a substantial annual limitation if ownership changes under Sections 382 and 383 of the Internal Revenue Code and similar state provisions are triggered by changes in the ownership of our capital stock. Our existing NOLs may be subject to limitations arising from previous ownership changes, including in connection with our initial public offering, or IPO, a follow-on offering in 2016, and any future follow-on public offerings. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change. There is also a risk that due to regulatory and legislative changes, such as suspensions on the use of NOLs, or other unforeseen reasons, our existing NOLs could expire or otherwise be unavailable to offset future income tax liabilities. Additionally, state NOLs generated in one state generally cannot be used to offset income generated in another state. For these reasons, we may be limited in our ability to fully utilize the tax benefit from the use of our NOLs, even if our profitability would otherwise allow for it.

We are a multinational organization faced with increasingly complex tax issues in many jurisdictions, and we could be obligated to pay additional taxes in various jurisdictions, including in the United States.

As a multinational organization, we are subject to taxation in jurisdictions around the world with increasingly complex tax laws, the application of which can be uncertain. The amount of taxes we pay in these jurisdictions could increase substantially as a result of changes in the applicable tax principles, including increased tax rates, new tax laws or revised interpretations of existing tax laws and precedents, which could have a material adverse effect on our liquidity and operating results. In addition, the authorities in these jurisdictions could review our tax returns and impose additional tax, interest and penalties, and the authorities could claim that various withholding requirements apply to us or our subsidiaries or assert that benefits of tax treaties are not available to us or our subsidiaries, any of which could have a material impact on us and the results of our operations.

There is growing pressure in many jurisdictions (including the United States) and from multinational organizations such as the Organization for Economic Co-operation and Development, or OECD, and the European Union, or EU, to amend existing international tax rules in order to render them more responsive to current global business practices. For example, the OECD has published measures for reform of the international tax rules as a product of its Base Erosion and Profit Shifting, or BEPS, initiative, which aims to standardize and modernize global tax policy and was endorsed by the G20 finance ministers. Many of the initiatives in the BEPS package will require amendments to the domestic tax legislation of various jurisdictions. Separately, the EU is asserting that a number of country-specific favorable tax regimes and rulings in certain member states may violate, or have violated, EU law, and may require some or all of the associated tax benefits to be refunded to the various taxing authorities by benefited taxpayers. Depending on the final form of the BEPS guidance and the legislation ultimately enacted by the OECD members, BEPS could have material adverse consequences on our effective tax rate, the amount of tax we pay and on our financial position and results of operations. Certain changes to the U.S. corporate tax system resulting from the Tax Act, in particular the requirement to subject foreign earnings to U.S. income taxes on a current basis, have had, and are expected to continue to have, a negative effect on our financial, operational and effective tax rate efficiencies.

Other legislative and regulatory proposals, as well as case law, may also affect our tax position or our business practices and operations, depending on whether and in what form they may ultimately take effect. Although we monitor these developments, due to the unpredictability and interdependency of these potential changes, it is very difficult to assess to what extent these changes may be implemented in the United States and other jurisdictions in which we conduct our business or to what extent these changes may impact the way in which we conduct our business or our effective tax rate due to the unpredictability and interdependency of these potential changes. For example, we are monitoring the litigation in *Altera Corp v. Commissioner* for its potential impact on us, as described in Note 14, *Income Taxes*, of the “Notes to Consolidated Financial Statements” contained in Part II, Item 8 of this Annual Report on Form 10-K. Changes in tax laws and related regulations and practices could have a material adverse effect on our business operations, effective tax rate and financial position and results of operations.

We are exposed to credit risk and fluctuations in the market values of our investment portfolio.

Credit ratings and pricing of our domestic and international investments can be negatively affected by liquidity, credit deterioration, financial results, economic risk, political risk, sovereign risk or other factors. As a result, the value and liquidity of our cash, cash equivalents and marketable securities may fluctuate substantially. Therefore, although we have not realized any significant losses on our cash, cash equivalents and marketable securities, future fluctuations in their value could result in a significant realized loss.

Risks Related to Our Intellectual Property

Our products may infringe the intellectual property rights of others, which could result in expensive litigation or require us to obtain a license to use the technology from third parties, or we may be prohibited from selling certain products in the future.

Companies in the industry in which we operate frequently are sued or receive informal claims of patent infringement or infringement of other intellectual property rights. We have, from time to time, received such claims from companies, including from competitors, suppliers and customers, some of whom have substantially more resources and have been developing relevant technologies for much longer than us.

Third parties may in the future assert claims against us concerning our existing products or with respect to future products under development, or with respect to products that we may acquire through acquisitions. We have entered into and may in the future enter into indemnification obligations in favor of our customers that could be triggered upon an allegation or finding that we are infringing other parties’ proprietary rights. If we do infringe a third party’s rights and are unable to provide a

sufficient work around, we may need to negotiate with holders of those rights in order to obtain a license to those rights or otherwise settle any infringement claim. A party that makes a claim of infringement against us may obtain an injunction preventing us from shipping products containing the allegedly infringing technology. We have from time to time received notices from third parties alleging infringement of their intellectual property and, in some cases, have entered into license agreements with such third parties with respect to such intellectual property. Any license agreements that we wish to enter into the future with respect to intellectual property rights may not be available to us on commercially reasonable terms, or at all. Generally, a license, if granted, would include payments of up-front fees, ongoing royalties or both. These payments or other terms, including any that restrict our ability to utilize the licensed technology in specified markets or geographic locations, could have a significant adverse effect on our operating results. In addition, in the event we are granted such a license, it is possible the license would be non-exclusive and other parties, including competitors, may be able to utilize such technology. Our larger competitors may be able to obtain licenses or cross-license their technology on better terms than we can, which could put us at a competitive disadvantage. In addition, our larger competitors may be able to buy such technology and preclude us from licensing or using such technology.

We may not in all cases be able to resolve allegations of infringement through licensing arrangements, settlement, alternative designs or otherwise. We may take legal action to determine the validity and scope of the third-party rights or to defend against any allegations of infringement. Holders of intellectual property rights could become more aggressive in alleging infringement of their intellectual property rights and we may be the subject of such claims asserted by a third party. For example, as described further in Part I, Item 3 “Legal Proceedings” in this Annual Report on Form 10-K, on January 21, 2016, ViaSat, Inc. filed a suit against us alleging, among other things, breach of contract, breach of the implied covenant of good faith and fair dealing and misappropriation of trade secrets. In the course of pursuing any of these means or defending against any lawsuits filed against us, we have incurred, and in the future may continue to incur, significant costs and diversion of our resources and our management’s attention. Due to the competitive nature of our industry, it is unlikely that we could increase our prices to cover such costs. In addition, such claims could result in significant penalties or injunctions that could prevent us from selling some of our products in certain markets or result in settlements or judgments that require payment of significant royalties or damages.

Our intellectual property rights are valuable, and any inability to protect them could reduce the value of our products, services and brand.

Our future success will depend, in large part, upon our intellectual property rights, including patents, copyrights, design rights, trade secrets, trademarks and know-how. We maintain a program of identifying technology appropriate for patent and trade secret protection. Our practice is to require employees and consultants to execute non-disclosure and proprietary rights agreements upon commencement of employment or consulting arrangements. These agreements acknowledge our exclusive ownership of all intellectual property developed by the individuals during their work for us and require that all proprietary information disclosed will remain confidential. Such agreements may not be enforceable in full or in part in all jurisdictions and any breach could have a negative effect on our business and our remedy for such breach may be limited.

Despite our efforts, these measures can only provide limited protection. Unauthorized third parties may try to copy or reverse engineer portions of our products, may breach our cybersecurity defenses or may otherwise obtain and use our intellectual property. Patents owned by us may be invalidated, circumvented or challenged. Any of our pending or future patent applications, whether or not being currently challenged, may not be issued with the scope of the claims we seek, if at all. Legal standards relating to the validity, enforceability and scope of protection of intellectual property rights in other countries are uncertain and may afford little or no effective protection for our proprietary rights. Consequently, we may be unable to prevent our intellectual property rights from being exploited abroad. Policing the unauthorized use of our proprietary rights is expensive, difficult and, in some cases, impossible. Litigation may be necessary in the future to enforce or defend our intellectual property rights, to protect our trade secrets or to determine the validity and scope of the proprietary rights of others. Such litigation could result in substantial costs and diversion of management resources, either of which could harm our business. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating our intellectual property. If we cannot protect our proprietary technology against unauthorized copying or use, we may not remain competitive.

Furthermore, many of our current and potential competitors have the ability to dedicate substantially greater resources to developing and protecting their technology or intellectual property rights than we do. In addition, our attempts to protect our proprietary technology and intellectual property rights may be further limited as our employees may be recruited by our current or future competitors and may take with them significant knowledge of our proprietary information. Consequently, others may develop services and methodologies that are similar or superior to our services and methodologies or may design around our intellectual property.

We may be subject to intellectual property litigation that could divert our resources.

In recent years, there has been significant litigation involving patents and other intellectual property rights in our industry. As we continue to gain greater market visibility, we face a higher risk of being the subject of intellectual property infringement claims. The risk of patent litigation has been amplified by the increase in the number of a type of patent holder, which we refer to as a non-practicing entity, whose sole business is to assert such claims. We could incur substantial costs in prosecuting or defending any intellectual property litigation. If we sue to enforce our rights or are sued by a third party that claims that our products infringe its rights, the litigation could be expensive and could divert our management resources.

Confidentiality arrangements with employees and others may not adequately prevent disclosure of trade secrets and other proprietary information.

We have devoted substantial resources to the development of our technology, business operations and business plans. In order to protect our trade secrets and proprietary information, we rely in significant part on confidentiality arrangements with our employees, licensees, independent contractors, advisers, channel partners, resellers and customers. These arrangements may not be effective to prevent disclosure of confidential information, including trade secrets, and may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. In addition, if others independently discover trade secrets and proprietary information, we would not be able to assert trade secret rights against such parties. Effective trade secret protection may not be available in every country in which our services are available or where we have employees or independent contractors. The loss of trade secret protection could make it easier for third parties to compete with our products by copying functionality. In addition, any changes in, or unexpected interpretations of, the trade secret and employment laws in any country in which we operate may compromise our ability to enforce our trade secret and intellectual property rights. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position.

We may be subject to damages resulting from claims that our employees or contractors have wrongfully used or disclosed alleged trade secrets of their former employees or other parties.

We could in the future be subject to claims that employees or contractors, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of our competitors or other parties. Litigation may be necessary to defend against these claims. If we fail in defending against such claims, a court could order us to pay substantial damages and prohibit us from using technologies or features that are essential to our products, if such technologies or features are found to incorporate or be derived from the trade secrets or other proprietary information of these parties. In addition, we may lose valuable intellectual property rights or personnel. A loss of key personnel or their work product could hamper or prevent our ability to develop, market and support potential products or enhancements, which could severely harm our business. Even if we are successful in defending against these claims, such litigation could result in substantial costs and be a distraction to management.

We license technology from third parties, and our inability to maintain those licenses could harm our business.

We incorporate technology, including software, which we license from third parties into our products. We cannot be certain that our licensors are not infringing the intellectual property rights of third parties or that our licensors have sufficient rights to the licensed intellectual property in all jurisdictions in which we may sell our products. Some of our agreements with our licensors may be terminated for convenience by them. If we are unable to continue to license any of this technology because of intellectual property infringement claims brought by third parties against our licensors or against us, or if we are unable to continue our license agreements or enter into new licenses on commercially reasonable terms, our ability to develop and sell products containing that technology would be severely limited, and our business could be harmed. Additionally, if we are unable to license necessary technology from third parties, we may be forced to acquire, at the same or higher cost, or expend additional resources to develop alternative technology of lower quality or performance standards. This would limit and delay our ability to offer new or competitive products and increase our costs of production. As a result, our margins, market share and operating results could be significantly harmed.

The use of open source software in our offerings may expose us to additional risks and harm our intellectual property.

Open source software is typically freely accessible, usable and modifiable. Certain open source software licenses require a user who intends to distribute the open source software as a component of the user's software to disclose publicly part or all of the source code to the user's software. In addition, certain open source software licenses require the user of such software to make any derivative works of the open source code available to others on unfavorable terms or at no cost. This can subject previously proprietary software to open source license terms.

We monitor and control our use of open source software that goes into or is used by our products in an effort to avoid unanticipated conditions or restrictions on our ability to successfully commercialize our products and believe that our compliance with the obligations under the various applicable licenses has mitigated the risks that we have triggered any such conditions or restrictions. However, such use may have inadvertently occurred in the development and offering of proprietary software on our products. Additionally, if a third-party software provider has incorporated certain types of open source software into software that we have licensed from such third party, we could be subject to the obligations and requirements of the applicable open source software licenses. This could harm our intellectual property position and have a material adverse effect on our business, results of operations and financial condition.

The terms of many open source software licenses have not been interpreted by U.S. or foreign courts, and there is a risk that those licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to successfully commercialize our products. For example, certain open source software licenses may be interpreted to require that we offer the software on our products that include the open source software for no cost; that we make available the source code for modifications or derivative works we create based upon, incorporating or using the open source software (or that we grant third parties the right to decompile, disassemble, reverse engineer, or otherwise derive such source code); that we license such modifications or derivative works under the terms of the particular open source license; or that otherwise impose limitations, restrictions or conditions on our ability to use, license, host, or distribute our products in a manner that limits our ability to successfully commercialize our products.

We could, therefore, be subject to claims alleging that we have not complied with the restrictions or limitations of the applicable open source software license terms or that our use of open source software infringes the intellectual property rights of a third party. In that event, we could incur significant legal expenses, be subject to significant damages, be enjoined from further sale and distribution of the software on our products that uses the open source software, be required to pay a license fee, be forced to reengineer the software on our products, or be required to comply with the foregoing conditions of the open source software licenses (including the release of the source code to our proprietary software), any of which could adversely affect our business. Even if these claims do not result in litigation or are resolved in our favor or without significant cash settlements, the time and resources necessary to resolve them could harm our business, results of operations, financial condition and reputation.

Additionally, the use of open source software can lead to greater risks than the use of third-party commercial software, as open source software does not come with warranties or other contractual protections regarding indemnification, infringement claims or the quality of the code.

Risks Related to the Ownership of Our Common Stock

Our stock price has been and may continue to be volatile and investors in our common stock may be unable to sell their shares at or above the price at which they were purchased.

The trading prices of the securities of technology companies, including technology companies in the industry in which we operate, have been highly volatile. Some of the factors that may cause the market price of our common stock to fluctuate include:

- price and volume fluctuations in the overall stock market from time to time;
- volatility in the market price and trading volume of comparable companies, in particular optical industry peer companies;
- actual or anticipated changes in our earnings or fluctuations in our operating results or in the expectations of securities analysts covering our industry or issuing market projection reports;
- announcements regarding the pending Merger;
- announcements of technological innovations, new products, strategic alliances or other transactions, or significant agreements by us or by our competitors;
- announcements by our customers regarding significant increases or decreases in capital expenditures and their results of operations;
- failure to accurately predict and interpret market requirements or market demand for our products;
- departure of key personnel;
- litigation involving us or that may be perceived as having an impact on our business;

- changes in general economic, industry and market conditions and trends, including the economic slowdown and delayed deployment and network expansion in China and the uncertainty related to Brexit;
- investors' general perception of us;
- significant short interest in our stock;
- sales of large blocks of our stock;
- loss of any of our key customers;
- a lack of guaranteed supply of manufactured wafers and other raw and finished components and incorporated products;
- announcements regarding further industry consolidation;
- changes in regulations or legislation in the United States and other jurisdictions in which we do business, including domestic and international tax reform, trade policy and tariffs and export controls that could impede our ability to sell our products to our customers in certain foreign jurisdictions, particularly in China, or that could impede sales by such customers in the United States; and
- actions or announcements by activist shareholders or others.

In the past, following periods of volatility in the market price of a company's securities, securities class action and shareholder derivative litigation has often been brought against that company. Class action and derivative litigation has been initiated against us and certain of our executive officers and directors in the past. Because of the volatility of our stock price, we may become the target of additional securities litigation in the future. Class action, derivative lawsuits and other securities litigation, whether successful or not, could result in substantial costs, damage, indemnification or settlement awards and divert management's attention and resources from running our business, which could materially harm our reputations, financial condition and results of operations.

Our quarterly operating results or other operating metrics have fluctuated significantly, and they are likely to continue to do so, which could cause the trading price of our common stock to decline.

Our quarterly operating results and other operating metrics have fluctuated in the past and are likely to continue to do so in the future. We expect that this trend will continue as a result of a number of factors, many of which are outside of our control and may be difficult to predict, including:

- the level of demand for our products and our ability to maintain and increase our customer base;
- the timing and success of new product introductions by us or our competitors or any other change in the competitive landscape of our market;
- the mix of products sold in a quarter;
- export control laws, tariffs, developments in trade policy or regulations that could impede our ability to sell our products to certain customers or other customers in certain foreign jurisdictions;
- pricing pressure as a result of competition or otherwise or price discounts negotiated by our customers;
- our ability to ramp production of new products with our contract manufacturers;
- delays or disruptions in our supply or manufacturing chain, including any delays or distributions related to the ongoing Covid-19 outbreak;
- our ability to reduce manufacturing costs;
- errors in our forecasting of the demand for our products, which could lead to lower revenue or increased costs;
- seasonal and period-over-period buying patterns of some of our customers;
- introduction of new products, with initial sales at relatively small volumes with resulting higher product costs;
- increases in and timing of sales and marketing, research and development and other operating expenses that we may incur to grow and expand our operations and to remain competitive;
- insolvency, credit consolidation or other difficulties faced by our customers, affecting their ability to purchase or pay for our products;

- insolvency, credit consolidation, or other difficulties confronting our suppliers and contract manufacturers leading to disruptions in our supply or distribution chain;
- levels of product order rescheduling, cancellations, returns and contractual price protection rights, including the impact of product quality problems on our reputation;
- adverse litigation judgments, settlements or other litigation-related costs;
- the pending Merger;
- product recalls, regulatory proceedings or other adverse publicity about our products;
- fluctuations in foreign exchange rates;
- the impact of the Tax Act and other legislative and regulatory proposals to reform U.S. taxation of international business activities;
- costs related to the acquisition of businesses, talent, technologies or intellectual property, including potentially significant amortization costs and possible write-downs; and
- general economic conditions in either domestic or international markets, particularly the impact of any economic slowdown in China.

Any one of the factors above or the cumulative effect of some of the factors above may result in significant fluctuations in our operating results.

The variability and unpredictability of our quarterly operating results or other operating metrics could result in our failure to meet our expectations or those of any analysts that cover us or investors in our common stock with respect to revenue or other operating results for a particular period. If we fail to meet or exceed such expectations for these or any other reasons, the market price of our common stock could fall substantially, and we could face costly lawsuits, including securities class action suits.

Because we do not expect to pay any dividends on our common stock for the foreseeable future, returns to investors in our common stock will be limited to any increase in the value of our common stock.

We have never paid cash dividends on our common stock and do not anticipate that we will pay any cash dividends to holders of our common stock in the foreseeable future. Instead, we plan to retain any earnings to maintain and expand our existing operations. Accordingly, investors in our common stock must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any return on their investment.

Anti-takeover provisions in our restated certificate of incorporation and our amended and restated by-laws, as well as provisions of Delaware law, might discourage, delay or prevent a change in control of our company or changes in our management and, therefore, depress the trading price of our common stock.

Our restated certificate of incorporation and amended and restated by-laws and Delaware law contain provisions that may discourage, delay or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which an investor in our common stock might otherwise receive a premium for their shares of our common stock. These provisions may also prevent or delay attempts by our stockholders to replace or remove our management. Our corporate governance documents include provisions:

- establishing a classified board of directors with staggered three-year terms so that not all members of our board are elected at one time;
- providing that directors may be removed by stockholders only for cause and only with a vote of the holders of at least 75% of the issued and outstanding shares of voting stock;
- limiting the ability of our stockholders to call and bring business before special meetings and to take action by written consent in lieu of a meeting;
- requiring advance notice of stockholder proposals for business to be conducted at meetings of our stockholders and for nominations of candidates for election to our board of directors;
- authorizing blank check preferred stock, which could be issued with voting, liquidation, dividend and other rights superior to our common stock; and
- limiting the liability of, and providing indemnification to, our directors and officers.

As a Delaware corporation, we are also subject to provisions of Delaware law, including Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders holding more than 15% of our outstanding voting stock from engaging in certain business combinations with us. Any provision of our amended and restated certificate of incorporation or amended and restated by-laws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors in our common stock are willing to pay for our common stock.

The existence of the foregoing provisions and anti-takeover measures could limit the price that investors in our common stock might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our company, thereby reducing the likelihood that an investor in our common stock could receive a premium for their common stock in an acquisition.

Our restated certificate and our amended and restated by-laws provide that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our restated certificate and our amended and restated by-laws provide that the Court of Chancery of the State of Delaware (or, in the case of our by-laws, if the Court of Chancery does not have jurisdiction, the United States District Court for the District of Delaware) is the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our certificate of incorporation or our by-laws; or any action asserting a claim against us that is governed by the internal affairs doctrine; and our by-laws provide that such court is the exclusive forum for any action against us or any director or officer or other employee of ours to interpret, apply, enforce or determine the validity of our certificate of incorporation or our by-laws. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our certificate of incorporation or our by-laws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

We have incurred and expect that we will continue to incur increased costs and demands upon management as a result of complying with the laws and regulations affecting public companies. These increased costs and demands could adversely affect our business, operating results and financial condition.

As a public company, we will continue to incur significant legal, accounting and other expenses. We are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, and the rules and regulations of the Nasdaq Global Select Market, or Nasdaq, and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. These requirements have increased and will continue to increase our legal, accounting and financial compliance costs and have made and will continue to make some activities more time consuming and costly.

The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and the effectiveness of our disclosure controls and procedures quarterly. Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, we are required to furnish a report by our management on the effectiveness of our internal control over financial reporting and an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. Compliance with Section 404, including documentation and evaluation of our internal control over financial reporting is both costly and challenging. If we are not able to comply with the requirements of Section 404 in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources and could adversely affect the market price of our common stock.

Furthermore, investor perceptions of our company may suffer if deficiencies are found, and this could cause a decline in the market price of our stock. Irrespective of compliance with Section 404, any failure of our internal control over financial reporting could have a material adverse effect on our stated operating results and harm our reputation.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time

consuming. These laws, regulations, and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We have and will continue to invest resources to comply with evolving laws, regulations and standards, and this investment has and may result in increased general and administrative expense and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Item 1B. *Unresolved Staff Comments*

None.

Item 2. *Properties*

Our corporate headquarters are located in Maynard, Massachusetts, where we occupy approximately 121,000 square feet pursuant to a lease expiring in February 2025. We also occupy approximately 46,000 square feet at our research center in Holmdel, New Jersey, pursuant to a lease expiring in December 2023, and lease office space in various other domestic and international locations. We believe that our current facilities are suitable and adequate to meet our current needs. We intend to add new facilities or expand existing facilities as we add employees, and we believe that suitable additional or substitute space will be available as needed to accommodate any such expansion of our operations.

Item 3. *Legal Proceedings*

On January 21, 2016, ViaSat, Inc. filed a lawsuit in California state court, 37-2016-00002323-CU-BC-NC, later removed to the U.S. District Court for the Southern District of California, against us alleging, among other things, breach of contract, breach of the implied covenant of good faith and fair dealing and misappropriation of trade secrets. On February 19, 2016, we responded to ViaSat's lawsuit and alleged counterclaims against ViaSat including, among other things, patent misappropriation, breach of contract, breach of the implied covenant of good faith and fair dealing, misappropriation of trade secrets and unfair competition. In its response filed March 16, 2016, ViaSat denied our counterclaims. On September 28, 2018 the matter was remanded back to the California Superior Court, County of San Diego, North County Division 3:16-cv-00463, D.I. 197.

In April 2019, the California Superior Court denied the parties' cross motions for summary adjudication. At the court's direction, the parties participated in a mandatory mediation process, but no resolution was reached. Trial took place in June and July of 2019, and the jury returned a verdict on July 17, 2019. The jury found against us for breach of contract, willful and malicious misappropriation of trade secrets, and breach of the covenant of good faith and fair dealing implied by law in the parties' contract. The jury also found that ViaSat breached the same contract and misappropriated our trade secrets. The jury awarded damages of \$49.3 million to ViaSat for our breaches of contract, and \$1 to ViaSat for its trade secret misappropriation claim. The jury awarded \$1 to us for ViaSat's misappropriation of trade secrets and awarded no damages to us for ViaSat's breach of contract. ViaSat filed post-trial motions seeking up to approximately \$10.0 million for attorney's fees and approximately \$6.2 million for so-called "cost-of-proof" sanctions and an order that we pay ongoing royalties on sales after December 30, 2018. ViaSat also sought a new trial and judgment in its favor notwithstanding the verdict on its trade secret damages claim. We filed post-trial motions for entry of judgment in our favor notwithstanding the verdict on ViaSat's breach of contract and trade secret damages claims and for a new trial, and moved to reduce the total damages awarded to ViaSat to no more than \$12.8 million pursuant to a provision of the contract containing a limitation on liability for claims arising from the contract. The Court denied the post-trial motions filed by both parties, and on December 5, 2019, the Court entered judgment, referred to as the December 2019 Judgment, against us in the amount of \$49.3 million, and against ViaSat in the amount of \$1. On January 17, 2020, the Court awarded ViaSat an additional \$0.1 million in costs. On December 20, 2019, we filed a notice of appeal of the December 2019 Judgment, and ViaSat filed a notice of cross-appeal on December 26, 2019. As of December 31, 2019, we have accrued a total of \$20.0 million in litigation and settlement-related accruals. The amount of such accruals is based upon currently available information and is subject to significant judgment and a variety of assumptions and known and unknown uncertainties, which may change quickly and significantly from time to time. As a result, actual losses could significantly exceed the amount of such accruals, and no conclusion as to our ultimate exposure from these proceedings should be drawn from such accruals. In view of the numerous legal, technical and factual issues involved in this lawsuit, we are not able to provide an estimate of the likely outcome or range of outcomes, if any, at this time.

On November 6, 2019 ViaSat, Inc. filed a second lawsuit in California Superior Court, County of San Diego, North County Division, 37-2019-00060731, D.I. 01, against us alleging breach of contract, breach of the implied covenant of good faith and fair dealing, and misappropriation of trade secrets. ViaSat's complaint relies on the verdict in the first lawsuit, seeks damages on sales of our products after December 31, 2018, and its claims for relief include preliminary and permanent

injunctive relief prohibiting sales of our products alleged by ViaSat to misappropriate its trade secrets. On January 17, 2020, we responded to ViaSat's second lawsuit with a general denial and moved to stay the case pending the resolution of the appeal in the first lawsuit. The hearing on our motion to stay is scheduled for February 28, 2020. In view of the numerous legal, technical and factual issues involved in this lawsuit, we are not able to provide an estimate of the likely outcome or range of outcomes, if any, at this time.

On July 28, 2017, we filed a lawsuit in the Commonwealth of Massachusetts Superior Court - Business Litigation Session against ViaSat asserting commercial disparagement, libel, slander of title, unfair competition, intentional interference with advantageous relations and intentional interference with contractual relations. On April 5, 2018, ViaSat responded to our action and alleged counterclaims including, among other things, breach of contract, breach of the implied covenant of good faith and fair dealing, misappropriation of trade secrets, and unfair competition. On December 13, 2018, the Massachusetts court entered an order staying the Massachusetts litigation pending resolution of the first California state court action discussed above. On December 12, 2019, the Massachusetts court entered an order continuing the stay of the Massachusetts litigation to and including July 10, 2020.

On August 5, 2019, a lawsuit, captioned Jiang v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-07267 (the "Jiang Action"), was filed against us and each of our directors in the United States District Court for the Southern District of New York alleging violations of Sections 14(a) and 20(a) of the Securities Exchange Act of 1934 (the "Exchange Act") and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a materially incomplete and misleading preliminary proxy statement in connection with the proposed merger of Acacia with the Parent and Merger Sub. On August 5, 2019, a putative class action lawsuit, captioned O'Brien v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-01463 (the "O'Brien Action"), was filed against us and each of our directors in the United States District Court for the District of Delaware alleging that our directors breached their fiduciary duties by, among other things, agreeing to the proposed Merger without taking steps to obtain adequate, fair and maximum consideration under the circumstances and engineering the proposed Merger to improperly benefit themselves, our management and/or the Parent without regard for the our public stockholders, and that Acacia and its directors violated Sections 14(a) and 20(a) of the Exchange Act by disseminating a materially incomplete and misleading preliminary proxy statement in connection with the proposed Merger. On August 6, 2019, a putative class action lawsuit, captioned Rosenblatt v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-01470 (the "Rosenblatt Action"), was filed against us and each of our directors in the United States District Court for the District of Delaware alleging violations of Sections 14(a) and 20(a) of the Exchange Act and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a false and misleading preliminary proxy statement in connection with the proposed Merger. On August 7, 2019, a lawsuit, captioned Mac v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-11706 (the "Mac Action"), was filed against us and each of our directors in the United States District Court for the District of Massachusetts alleging violations of Sections 14(a) and 20(a) of the Exchange Act and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a materially deficient and misleading preliminary proxy statement in connection with the proposed Merger. The plaintiffs in these lawsuits seek various forms of injunctive and declaratory relief, as well as awards of damages, costs, expert fees and attorneys' fees.

On August 27, 2019, Acacia and the plaintiffs in the O'Brien Action, the Rosenblatt Action and the Mac Action entered into a memorandum of understanding in which these plaintiffs agreed to dismiss with prejudice their individual claims and to dismiss without prejudice the class claims asserted in those actions, in return for our agreement to make the supplemental disclosures set forth under the heading "Supplement to Proxy Statement" in our Current Report on Form 8-K filed with the Securities and Exchange Commission on August 27, 2019 (the "Supplemental Disclosures"). On August 27, 2019, Acacia and the plaintiff in the Jiang Action agreed in principle that the plaintiff would dismiss with prejudice his claims asserted in that action, in return for our agreement to make the Supplemental Disclosures; that agreement was memorialized in a memorandum of understanding between Acacia and the plaintiff in the Jiang Action entered into on August 28, 2019. Pursuant to the memoranda of understanding, the plaintiffs in all four actions filed notices of voluntary dismissal on September 11, 2019. Pursuant to the memoranda of understanding, the plaintiffs in these four actions and their counsel reserved their right to file applications seeking attorney's fees and expenses based upon the purported benefit they believe was conferred upon Acacia stockholders by causing the Supplemental Disclosures to be disseminated, and we reserved our right to oppose such fee applications. The parties have resolved the fee claim and no fee application will be necessary.

We intend to continue to engage in a vigorous defense and pursuit of Acacia-favorable judgments of the ongoing litigation matters described above. The ultimate resolution of these proceedings may have a material adverse effect on our results of operations and cash flows, potentially in the near term. In addition, the timing of the final resolution of these proceedings is uncertain. We will continue to incur litigation and other expenses as a result of these proceedings, which could have a material impact on our business, consolidated financial position, results of operations and cash flows.

In addition, from time to time we may become involved in legal proceedings or be subject to claims arising in the ordinary course of our business. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of these ordinary course matters will not have a material adverse effect on our business or on our consolidated financial position, results of operations or cash flows. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

Item 4. *Mine Safety Disclosures*

Not applicable.

PART II

Item 5. *Market for Registrant’s Common Shares, Related Stockholder Matters and Issuer Purchases of Equity Securities*

Market Information

Our common stock has been listed on the Nasdaq Global Select Market under the symbol “ACIA” since May 13, 2016.

Holders

As of the close of business on February 14, 2020, there were approximately 17 holders of record of our common stock according to the records of our transfer agent. A greater number of holders of our common stock are “street name” or beneficial owners, whose shares of record are held by banks, brokers and other financial institutions.

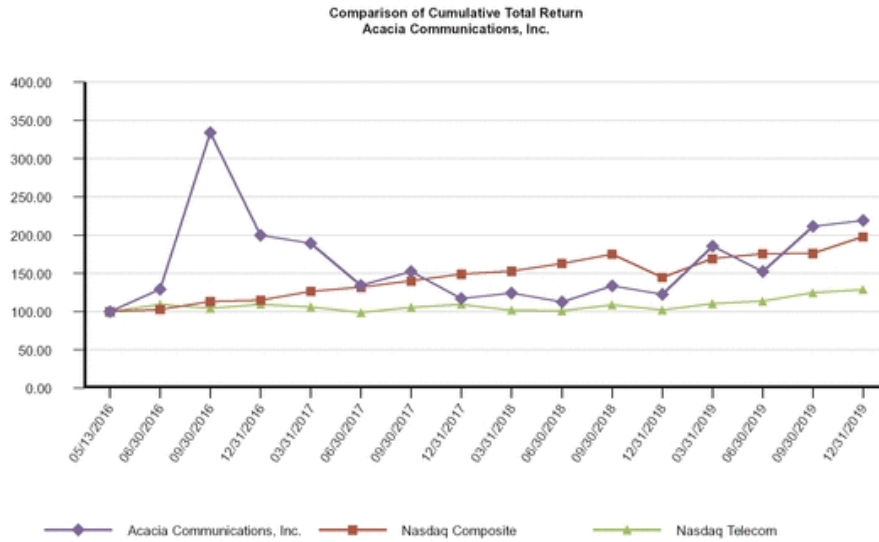
Dividend Policy

We have never declared or paid any dividends on our capital stock. We intend to retain future earnings, if any, to finance the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. Any future determination to declare dividends will be subject to the discretion of our board of directors and applicable law, and will depend on various factors, including our results of operations, financial condition, prospects and any other factors deemed relevant by our board of directors.

Performance Graph

This performance graph shall not be deemed “soliciting material” or to be “filed” with the SEC for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, Exchange Act, or otherwise subject to the liabilities under that section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act of 1933, as amended, or the Exchange Act.

The following graph compares the cumulative total return to stockholders for our common shares for the period from May 13, 2016 (the date our common stock began trading on the Nasdaq Global Select Market) through December 31, 2019 with the Nasdaq Composite Index and the market sector Nasdaq Telecommunications Index. The comparison assumes an investment of \$100 is made on May 13, 2016 in our common shares and in each of the indices and in the case of the indices it also assumes reinvestment of all dividends. The performance shown is not necessarily indicative of future performance.



Recent Sales of Unregistered Securities

None.

Use of Proceeds

None.

Purchases of Equity Securities by the Issuer and Affiliated Purchaser

None.

Item 6. Selected Financial Data

The consolidated income statement data for the years ended December 31, 2019, 2018 and 2017, and the selected consolidated balance sheet data as of December 31, 2019 and 2018, are derived from our audited consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. The consolidated income statement data for the years ended December 31, 2016 and 2015 and the selected balance sheet data as of December 31, 2017, 2016 and 2015 has been derived from our audited financial statements not appearing in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results to be expected in any future period. You should read the following selected consolidated financial data in conjunction with Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and the related notes appearing elsewhere in this Annual Report on Form 10-K.

	Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in thousands)				
Consolidated Income Statement Data:					
Revenue	\$ 464,663	\$ 339,891	\$ 385,166	\$ 478,412	\$ 239,056
Cost of revenue(1)	243,981	192,771	217,326	257,425	145,350
Gross profit	220,682	147,120	167,840	220,987	93,706
Operating expenses:					
Research and development(1)	128,700	102,406	92,027	75,696	38,645
Sales, general and administrative(1)	80,581	51,864	38,807	27,676	13,124
(Gain) loss on disposal of property and equipment	—	—	(47)	25	—
Total operating expenses	209,281	154,270	130,787	103,397	51,769
Income (loss) from operations	11,401	(7,150)	37,053	117,590	41,937
Total other income (expense), net	10,240	6,746	3,250	(2,969)	(2,132)
Income (loss) before (benefit) provision for income taxes	21,641	(404)	40,303	114,621	39,805
(Benefit) provision for income taxes	(11,198)	(5,320)	1,795	(16,956)	(715)
Net income	\$ 32,839	\$ 4,916	\$ 38,508	\$ 131,577	\$ 40,520
Net income per share attributable to common stockholders:					
Basic	\$ 0.80	\$ 0.12	\$ 0.99	\$ 3.77	\$ 1.18
Diluted	\$ 0.77	\$ 0.12	\$ 0.92	\$ 3.22	\$ 0.91

- (1) Stock-based compensation included in the consolidated income statement data above was as follows:

	Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in thousands)				
Cost of revenue	\$ 2,047	\$ 2,075	\$ 1,993	\$ 1,629	\$ 75
Research and development	21,383	17,564	14,150	12,347	561
Sales, general and administrative	11,723	9,975	7,230	6,769	189
Total stock-based compensation	\$ 35,153	\$ 29,614	\$ 23,373	\$ 20,745	\$ 825

December 31,

	2019	2018	2017	2016	2015
	(in thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	\$ 36,617	\$ 60,444	\$ 67,495	\$ 206,402	\$ 27,610
Marketable securities	434,761	339,424	297,115	104,004	—
Working capital	368,912	370,445	361,621	381,707	55,147
Total assets	721,415	601,859	611,250	516,936	130,744
Total liabilities	142,992	99,132	109,200	82,141	51,948
Redeemable convertible preferred stock	—	—	—	—	70,780
Total stockholders' equity	578,423	502,727	502,050	434,795	8,016

Item 7. *Management's Discussion and Analysis of Financial Condition and Results of Operations*

You should read the following discussion of our financial condition and results of operations together with our consolidated financial statements and the related notes and other financial information included elsewhere in this Annual Report on Form 10-K. The following discussion contains forward-looking statements that reflect our plans, estimates and beliefs. Our actual results could differ materially from those discussed in the forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Annual Report on Form 10-K, particularly in the section titled "Risk Factors."

Company Overview

Our mission is to deliver high-speed coherent optical interconnect products that transform communications networks, relied upon by cloud infrastructure operators and content and communication service providers, through improvements in performance and capacity and reductions in associated costs. By implementing optical interconnect technology in a silicon-based platform, a process we refer to as the siliconization of optical interconnect, we believe we are leading a disruption that is analogous to the computing industry's integration of multiple functions into a microprocessor. Our products fall into three product groups: embedded modules, pluggable modules and semiconductors. Our embedded module and pluggable module product groups consist of optical interconnect modules with transmission speeds ranging from 100 to 1,200 gigabits per second, or Gbps, for use in long-haul, metro and inter-data center markets. Our semiconductor product group consists of our low-power coherent digital signal processor application-specific integrated circuits, or DSP ASICs, and our silicon photonic integrated circuits, or silicon PICs, which are either integrated into our embedded and pluggable modules or sold to customers on a standalone basis for integration into internally developed or other merchant modules. We are also developing a 400ZR module that will expand our pluggable module product group, and enable inter-data center transmission capacity of 400 Gbps in the same compact pluggable form factors used for 400G client optics, including QSFP-DD and OSFP. Our modules perform a majority of the digital signal processing and optical functions in optical interconnects and offer low power consumption, high density and high speeds at attractive price points. Through the use of standard interfaces, our modules can be easily integrated with customers' network equipment. The advanced software in our modules enables increased configurability and automation, provides insight into network and connection point characteristics and helps identify network performance problems, all of which increase flexibility and reduce operating costs.

Key Factors Affecting our Performance

We believe that our future success will depend on many factors, including our ability to expand sales of our products to our existing customers, expand our customer base and drive the adoption of our products in adjacent markets. While these areas present significant opportunity, they also present risks that we must manage to ensure successful results. See Part I, Item 1A, "Risk Factors" in this Annual Report on form 10-K for a discussion of these risks. If we are unable to address these challenges, our business could be adversely affected.

Network Service Provider Investment in High-Speed Optical Equipment. Cloud and service providers are continuing to invest in higher capacity networks to support the continued growth in demand for data traffic. We believe that 100 to 1,200 Gbps coherent optical technologies will continue to replace older technologies in long-haul, metro and inter-data center networks. Our business and results depend on the continued investment by network service providers in these advanced networks.

Expanding Sales to Existing Customer Base. We expect that a substantial portion of our future sales will be follow-on sales to existing customers. One of our sales strategies is to maintain a high level of customer satisfaction by delivering our products with compelling value propositions. We believe that our current customers present us with significant opportunities for additional product sales given the existing and expected market share of these customers and our prior sales experience with them. We also believe that our customers will continue to design our products into their network equipment products in an effort to maintain and potentially grow their market share over time as growth in the overall market for optical interconnect technology continues to grow. Our customers have historically shown a high propensity to purchase new products from us over multiple quarters and in many cases over multiple years. In addition, several of our customers have elected to integrate an increasing number of our products into their network equipment product lines.

Adding New Customers. We believe that the metro and inter-data center markets are still in the early stages of adoption. We intend to add new customers over time by continuing to invest in our technology and business development team to capitalize on these new opportunities and through potential strategic transactions. Our products and technology have accelerated the rate at which optical interconnect technology can be easily deployed and designed into newer generation network equipment, thus making it easier to integrate our products across many system applications. Generally, we educate

prospective customers in these markets about the technical merits and capabilities of our products, the potential cost savings of our products and the costs of designing and utilizing internally developed solutions. We build relationships with prospective customers at all levels in a customer's organizational hierarchy. We believe that customer references combined with our product and technology strengths and capabilities have been, and will continue to be, an important factor in winning new business.

Selling More Highly Integrated and Higher-Performance Products. Our results of operations have been, and we believe will continue to be, affected by our ability to design and sell more highly integrated products with improved performance and increased functionality. We aim to grow our revenue and expand our margins by enabling customers to transition from previously deployed 10 and 40 Gbps solutions to our 100 to 1,200 Gbps modules and demonstrate the value proposition to the growing number of metro and inter-data center network equipment designers and manufacturers. Our ability to maintain our current revenue levels and sustain our gross margins will depend, in part, upon our continued sales of our newer, more integrated and higher performance products, and our quarterly results of operations can be significantly impacted by the mix of products sold during the period.

Investing in Research and Development for Growth. We believe that the market for our optical interconnect technology products is still in the early stages of adoption and we intend to continue investing for long-term growth. We expect to continue to invest heavily in coherent digital signal processing, optics integration, silicon photonics, hardware engineering and software, all of which afford ongoing vertical integration of components into our core technologies. By investing in research and development, we believe we will be well positioned to continue to design new products and grow our business and take advantage of our large market opportunity. We expect that our results of operations will be impacted by the timing and size of these investments.

Customer Concentration. Our five largest customers, which differed by period, collectively accounted for 81% of our revenue in 2019, 74% of our revenue in 2018 and 70% of our revenue in 2017. We expect continued variability in our customer concentration and timing of sales on a quarterly and annual basis. In addition, we have provided, and may in the future provide, annual and semi-annual pricing reductions and pricing discounts to large volume customers, which may result in lower margins for the period in which such sales occur. Our gross margins may also fluctuate as a result of the timing of such sales and the mix of products sold to large volume customers.

Key Components of our Results of Operations

Revenue

We derive substantially all of our revenue from the sale of our products, which we sell through our direct sales force. We sell a substantial majority of our products to network equipment manufacturers for ultimate sale to communications and content service providers and data center and cloud infrastructure operators, which we refer to together as cloud and service providers, and we expect network equipment manufacturer customers to be the primary market for our products for the foreseeable future. Our negotiated terms and conditions of sale do not allow for product returns.

Our revenue is affected by changes in the number, product mix and average selling prices of our products. Our product revenue is typically characterized by a life cycle that begins with sales of pre-production samples and prototypes followed by the sale of early production models with higher average selling prices and lower volumes, followed by broader market adoption, higher volumes, and average selling prices that are lower than initial levels. In addition, our product revenue may be affected by contractual commitments to significant customers that obligate us to reduce the selling price of our products on an annual or semi-annual basis.

Cost of Revenue

Our cost of revenue is comprised primarily of the costs of procuring goods from our contract manufacturers and other suppliers. In addition, cost of revenue includes assembly, test, quality assurance, warranty and logistics-related fees, impacts of manufacturing yield, depreciation, general overhead costs and costs associated with excess and obsolete inventory.

Personnel-related expenses include salaries, benefits and stock-based compensation, as well as consulting fees for those personnel engaged in the management of our contract manufacturers, new product manufacturing activities, logistical support, manufacturing and test engineering and supply chain management.

Gross Profit

Our gross profit has been, and may in the future be, influenced by several factors including changes in product mix, sales of more highly integrated products, target end markets for our products, pricing due to competitive pressure and favorable and unfavorable changes in production costs, including global demand for electronic components used in our products. As some products mature and unit volumes increase, the average selling prices of those products may decline. These declines often coincide with improvements in manufacturing yields and lower wafer, component, assembly and test costs, which lower production costs and may offset some of the margin reduction that results from lower selling prices. We anticipate that our newer modules, which integrate our silicon PIC, will contribute higher gross profit over time than some of our older products, because the integration of our silicon PIC into these products eliminates the need for us to purchase several high-cost discrete components for the same level of functionality, thus improving margins on these products. In addition, we have shifted the manufacturing of our products to contract manufacturers located in lower-cost regions, which generally decreases the cost of the manufacturing of these products and correspondingly improves margins. However, the current U.S. Administration has made significant changes to U.S. trade policy, and the U.S. President, members of his administration, and other public officials, including members of the current U.S. Congress, continue to signal a willingness to revise, renegotiate, or terminate various multilateral trade agreements under which U.S. companies currently exchange products and services around the world, and to impose new taxes on certain goods imported into the United States or other adverse consequences on companies importing certain goods into the United States. Since we rely primarily upon non-U.S. manufacturers to make our products, such steps could make our products more expensive and less competitive in the U.S. market. These enacted changes or pending legislation or executive actions could significantly increase our cost of manufacturing our products and decrease our margins. There can be no assurance that pending or future legislation or executive action in the United States will not be enacted. See Part I, Item 1A, “Risk Factors” in this Annual Report on Form 10-K under the heading “Risks Related to our Business and Industry—Changes in U.S. trade policies could disrupt global supply, manufacturing and customer relationships, which may materially increase costs of components contained in our products, increase our manufacturing costs and make our products more expensive or unavailable in foreign markets” for further information.

Although we primarily procure and sell our products in U.S. dollars, our contract manufacturers incur many costs, including labor and component costs, in other currencies. To the extent that the exchange rates move unfavorably for our contract manufacturers, they may try to pass resulting costs on to us, which could have a material effect on our future average unit costs. Our gross profit may fluctuate from period to period as a result of changes in average selling prices related to new product introductions, existing product transitions into larger scale commercial volumes, maturity of a product within its life cycle, the effect of prototype and sample sales and resulting mix of modules or semiconductors within our product groups. In future periods, we may hedge certain significant transactions denominated in currencies other than the U.S. dollar.

Operating Expenses

We classify our operating expenses as research and development and sales, general and administrative expenses.

- *Research and development expenses* consist primarily of salary and benefit expenses, including stock-based compensation, for employees and costs for contractors engaged in research, design and development activities incurred directly, and with support from, external vendors, such as outsourced research and development costs, as well as costs for prototypes, depreciation, purchased intellectual property, facilities and travel. In future periods, we may hedge certain significant outsourced research and development transactions denominated in currencies other than the U.S. dollar. Over time, we expect our research and development costs to increase in absolute dollars as we continue making significant investments in developing new products and new technologies, including with respect to increased performance and smaller industry-standard form factors.
- *Sales, general and administrative expenses* include salary and benefit expenses, including stock-based compensation, for employees and costs for contractors engaged in sales, marketing, customer service, technical support, and general and administrative activities, as well as the costs of legal and other professional services expenses, trade shows, marketing programs, promotional materials, bad debt expense, facilities, general liability insurance and travel. In 2019, this also included acquisition-related costs related to the proposed Merger. Over time, we expect our sales, general and administrative expenses to increase in absolute dollars primarily due to our continued efforts to expand our business.

Other Income, Net

Other income, net primarily consists of interest income earned on our cash and investment balances and foreign currency transaction gains and losses. To date, we have not utilized derivatives to hedge our foreign exchange risk as we believe the risk to be immaterial to our results of operations. In future periods, we may hedge certain significant transactions denominated in currencies other than the U.S. dollar as we expand our international operations.

(Benefit) Provision for Income Taxes

We are subject to income taxes in the United States and foreign jurisdictions in which we do business. These foreign jurisdictions have statutory tax rates different from those in the United States. Our effective tax rates will vary depending on the relative proportion of foreign to U.S. income, the absorption of foreign tax credits, changes in corporate structure, changes in the valuation of our deferred tax assets and liabilities and changes in tax laws and interpretations of those laws. We plan to regularly assess the likelihood of outcomes that could result from the examination of our tax returns by the IRS and other tax authorities to determine the adequacy of our income tax reserves and expense. Should actual events or results differ from our then-current expectations, charges or credits to our (benefit) provision for income taxes may become necessary. Any such adjustments could have a significant effect on our results of operations. See Part I, Item 1A, "Risk Factors" in this Annual Report on Form 10-K under the heading "Risks Related to our Business and Industry—The final determination of our income tax liability may be materially different from our income tax provision" for further information.

Results of Operations

The following tables set forth the components of our consolidated income statements for each of the periods presented and as a percentage of revenue for those periods. The period-to-period comparison of operating results is not necessarily indicative of results for future periods.

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Consolidated Income Statement Data:			
Revenue	\$ 464,663	\$ 339,891	\$ 385,166
Cost of revenue(1)	243,981	192,771	217,326
Gross profit	220,682	147,120	167,840
Operating expenses:			
Research and development(1)	128,700	102,406	92,027
Sales, general and administrative(1)	80,581	51,864	38,807
Gain on disposal of property and equipment	—	—	(47)
Total operating expenses	209,281	154,270	130,787
Income (loss) from operations	11,401	(7,150)	37,053
Total other income, net	10,240	6,746	3,250
Income (loss) before (benefit) provision for income taxes	21,641	(404)	40,303
(Benefit) provision for income taxes	(11,198)	(5,320)	1,795
Net income	\$ 32,839	\$ 4,916	\$ 38,508

(1) Stock-based compensation included in the consolidated income statement data was as follows:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Cost of revenue	\$ 2,047	\$ 2,075	\$ 1,993
Research and development	21,383	17,564	14,150
Sales, general and administrative	11,723	9,975	7,230
Total stock-based compensation	\$ 35,153	\$ 29,614	\$ 23,373

	Year Ended December 31,		
	2019	2018	2017
Revenue	100 %	100 %	100%
Cost of revenue	53 %	57 %	56%
Gross profit	47 %	43 %	44%
Operating expenses:			
Research and development	28 %	30 %	24%
Sales, general and administrative	17 %	15 %	10%
Gain on disposal of property and equipment	—	—	—
Total operating expenses	45 %	45 %	34%
Income (loss) from operations	2 %	(2)%	10%
Total other income, net	2 %	2 %	1%
Income (loss) before (benefit) provision for income taxes	5 %	—%	10%
(Benefit) provision for income taxes	(2)%	(2)%	—%
Net income	7 %	1 %	10%

Percentages in the table above are based on actual values. Totals may not sum due to rounding.

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Revenue

Revenue by product type and the related changes during the years ended December 31, 2019 and 2018 were as follows:

	Year Ended	As a % of	Year Ended	As a % of	Change in	
	December 31, 2019	Total Revenue	December 31, 2018	Total Revenue	\$	%
	(dollars in thousands)					
Embedded Modules	\$ 86,932	19%	\$ 77,286	23%	\$ 9,646	12%
Pluggable Modules	217,620	47%	189,533	56%	28,087	15%
Semiconductors	160,111	34%	73,072	21%	87,039	119%
Total revenue	\$ 464,663	100%	\$ 339,891	100%	\$ 124,772	37%

Revenue increased by \$124.8 million, or 37%, to \$464.7 million in the year ended December 31, 2019 from \$339.9 million in the year ended December 31, 2018. The increase was primarily due to an \$87.0 million increase in sales of our semiconductors, a \$28.1 million increase in sales of our pluggable modules and a \$9.6 million increase in sales of our embedded modules. In the years ended December 31, 2019 and 2018, we derived 34% and 29%, respectively, of our revenue from sales to customers with ship-to locations in China.

Cost of Revenue and Gross Profit

	Year Ended December 31,		Change in	
	2019	2018	\$	%
	(dollars in thousands)			
Cost of revenue	\$ 243,981	\$ 192,771	\$ 51,210	27%
Gross profit percentage	47.5%	43.3%		

Cost of revenue increased \$51.2 million, or 27%, to \$244.0 million in the year ended December 31, 2019 from \$192.8 million in the year ended December 31, 2018. The increase was mainly due to increased sales volumes, partially offset by a favorable impact of fixed costs relative to the current period revenue volume.

Our gross profit percentage increased to 47.5% in the year ended December 31, 2019 compared to 43.3% in the year ended December 31, 2018. The increase in gross profit percentage was primarily the result of by a favorable impact of fixed costs relative to the current period revenue volume.

Research and Development

	Year Ended December 31,		Change in	
	2019	2018	\$	%
	(dollars in thousands)			
Research and development	\$ 128,700	\$ 102,406	\$ 26,294	26%

Research and development expense increased \$26.3 million, or 26%, to \$128.7 million in the year ended December 31, 2019 from \$102.4 million in the year ended December 31, 2018. The increase was primarily due to a \$20.0 million increase in personnel-related and other costs as we continued investing in our product and technology roadmap and a \$7.4 million increase related to the timing of milestone payments associated with our development programs, which were partially offset by a \$1.1 million decrease in prototype development costs.

Sales, General and Administrative

	Year Ended December 31,		Change in	
	2019	2018	\$	%
	(dollars in thousands)			
Sales, general and administrative	\$ 80,581	\$ 51,864	\$ 28,717	55%

Sales, general and administrative expenses increased \$28.7 million, or 55%, to \$80.6 million in the year ended December 31, 2019 from \$51.9 million in the year ended December 31, 2018. This increase was primarily due to a \$14.9 million increase in estimated legal and settlement costs related to ongoing litigation matters, a \$7.6 million increase in acquisition-related costs related to the proposed Merger, and a \$6.2 million increase in personnel-related and other costs as we increased sales and customer support staffing and related support resources.

Other Income, Net

	Year Ended December 31,		Change in	
	2019	2018	\$	%
	(dollars in thousands)			
Total other income, net	\$ 10,240	\$ 6,746	\$ 3,494	52%

Total other income, net increased \$3.5 million, or 52%, to \$10.2 million during the year ended December 31, 2019 from \$6.7 million in the year ended December 31, 2018 due to a \$3.2 million increase in interest income earned from marketable securities.

Benefit from Income Taxes

	Year Ended December 31,		Change in	
	2019	2018	\$	%
	(dollars in thousands)			
Benefit from income taxes	\$ (11,198)	\$ (5,320)	\$ (5,878)	110 %
Effective tax rate	(52)%	1,317%		(1,369)%

The benefit from income taxes for the year ended December 31, 2019 was \$11.2 million compared to \$5.3 million for the year ended December 31, 2018. The benefit from income taxes recorded in the year ended December 31, 2019 was primarily a result of the recognition of excess tax benefits from the taxable compensation on share-based awards recognized in the year ended December 31, 2019 and federal and state research and development credits. These tax benefits were partially offset by an increase in U.S. taxes on our pre-tax income position in the year ended December 31, 2019. The benefit from income taxes recorded in the year ended December 31, 2018 was primarily a result of our pre-tax loss position in the year ended December 31, 2018, the recognition of excess tax benefits from the taxable compensation on share-based awards

recognized in the year ended December 31, 2018 and federal and state research and development credits. These tax benefits were partially offset by an increase in U.S. tax as a result of the Tax Act which subjects foreign earnings to U.S. taxes. Our historical provision for income taxes is not necessarily reflective of our future results of operations.

Taxable income in any jurisdiction is dependent upon acceptance of our operational practices and intercompany transfer pricing by local tax authorities as being on an arm's length basis. Due to inconsistencies in application of the arm's length standard among taxing authorities, as well as lack of adequate treaty-based protection, transfer pricing challenges by tax authorities could, if successful, substantially increase our income tax expense.

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Revenue

Revenue by product type and the related changes during the years ended December 31, 2018 and 2017 were as follows:

	Year Ended	As a % of	Year Ended	As a % of	Change in	
	December 31, 2018	Total Revenue	December 31, 2017	Total Revenue	\$	%
	(dollars in thousands)					
Embedded Modules	\$ 77,286	23%	\$ 113,381	29%	\$ (36,095)	(32)%
Pluggable Modules	189,533	56%	210,652	55%	(21,119)	(10)%
Semiconductors	73,072	21%	61,133	16%	11,939	20 %
Total revenue	\$ 339,891	100%	\$ 385,166	100%	\$ (45,275)	(12)%

Revenue decreased by \$45.3 million, or 12%, to \$339.9 million in the year ended December 31, 2018 from \$385.2 million in the year ended December 31, 2017. The decrease was primarily due to a \$36.1 million decrease in sales of our embedded modules and a \$21.1 million decrease in sales of our pluggable modules, and was partially offset by an \$11.9 million increase in sales of our semiconductors. In the years ended December 31, 2018 and 2017, we derived 29% and 39%, respectively, of our revenue from sales to customers with ship-to locations in China.

Cost of Revenue and Gross Profit

	Year Ended December 31,		Change in	
	2018	2017	\$	%
	(dollars in thousands)			
Cost of revenue	\$ 192,771	\$ 217,326	\$ (24,555)	(11)%
Gross profit percentage	43.3%	43.6%		

Cost of revenue decreased \$24.6 million, or 11%, to \$192.8 million in the year ended December 31, 2018 from \$217.3 million in the year ended December 31, 2017. The decrease was mainly due to decreased sales volumes.

Our gross profit percentage was generally consistent at 43.3% in the year ended December 31, 2018 compared to 43.6% in the year ended December 31, 2017.

Research and Development

	Year Ended December 31,		Change in	
	2018	2017	\$	%
	(dollars in thousands)			
Research and development	\$ 102,406	\$ 92,027	\$ 10,379	11%

Research and development expense increased \$10.4 million, or 11%, to \$102.4 million in the year ended December 31, 2018 from \$92.0 million in the year ended December 31, 2017. This increase was primarily due to a \$10.5 million increase in personnel-related and other costs and a \$3.3 million increase in prototype development costs as we continued investing in our

product and technology roadmap, which were partially offset by a \$3.4 million decrease related to the timing of milestone payments associated with our development programs.

Sales, General and Administrative

	Year Ended December 31,		Change in	
	2018	2017	\$	%
	(dollars in thousands)			
Sales, general and administrative	\$ 51,864	\$ 38,807	\$ 13,057	34%

Sales, general and administrative expenses increased \$13.1 million, or 34%, to \$51.9 million in the year ended December 31, 2018 from \$38.8 million in the year ended December 31, 2017, due to a \$7.7 million increase in personnel-related and other costs as we increased sales and customer support staffing and related support resources, as well as a \$5.4 million increase in professional services expenses. The increase in professional service expenses was primarily attributable to increased legal expenses, including costs incurred in connection with the matters described in Part I, Item 3 “Legal Proceedings” in this Annual Report on Form 10-K, costs incurred in connection with the securities class action complaint, which was dismissed on June 25, 2018, and costs incurred in connection with the shareholder derivative and Section 220 litigation, which was settled on January 24, 2019.

Other Income, Net

	Year Ended December 31,		Change in	
	2018	2017	\$	%
	(dollars in thousands)			
Total other income, net	\$ 6,746	\$ 3,250	\$ 3,496	108%

Total other income, net increased \$3.5 million, or 108%, to \$6.7 million during the year ended December 31, 2018 from \$3.3 million in the year ended December 31, 2017, due to a \$3.8 million increase in interest income earned on marketable securities.

(Benefit) Provision for Income Taxes

	Year Ended December 31,		Change in	
	2018	2017	\$	%
	(dollars in thousands)			
(Benefit) provision for income taxes	\$ (5,320)	\$ 1,795	\$ (7,115)	(396)%
Effective tax rate	1,317%	4%		1,313%

The benefit from income taxes for the year ended December 31, 2018 was \$5.3 million compared to a provision for income taxes of \$1.8 million for the year ended December 31, 2017. The benefit from income taxes recorded in the year ended December 31, 2018 was primarily a result of our pre-tax loss position in the year ended December 31, 2018, the recognition of excess tax benefits from the taxable compensation on share-based awards recognized in the year ended December 31, 2018 and federal and state research and development credits. These tax benefits are partially offset by an increase in U.S. tax as a result of the Tax Act which subjects foreign earnings to U.S. taxes. The provision for income taxes recorded in the year ended December 31, 2017 was primarily a result of the impact of U.S. tax reform including the one-time transition tax on such earnings of certain foreign subsidiaries that were previously tax-deferred and the re-measurement of deferred tax assets and liabilities to the new U.S. federal corporate tax rate of 21%. Our historical provision for income taxes is not necessarily reflective of our future results of operations.

Taxable income in any jurisdiction is dependent upon acceptance of our operational practices and intercompany transfer pricing by local tax authorities as being on an arm’s length basis. Due to inconsistencies in application of the arm’s length standard among taxing authorities, as well as lack of adequate treaty-based protection, transfer pricing challenges by tax authorities could, if successful, substantially increase our income tax expense.

Liquidity and Capital Resources

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Cash and cash equivalents	\$ 36,617	\$ 60,444	\$ 67,495
Marketable securities	434,761	339,424	297,115
Working capital	368,912	370,445	361,621
Net cash provided by operating activities	72,819	83,085	61,893
Net cash used in investing activities	(103,579)	(56,237)	(207,907)
Net cash provided by (used in) financing activities	6,933	(33,899)	5,477

We fund our operations primarily through cash generated from operations. As of December 31, 2019, we had cash and cash equivalents totaling \$36.6 million, marketable securities of \$434.8 million and accounts receivable of \$97.9 million.

We believe our existing cash balances and anticipated cash flow from future operations will be sufficient to meet our working capital and capital expenditure needs for at least the next 12 months and the foreseeable future. Our future capital requirements may vary materially from those currently planned and will depend on many factors, including our rate of revenue growth, the timing and extent of spending on research and development efforts and other business initiatives, purchases of capital equipment to support our growth, the expansion of sales and marketing activities, any expansion of our business through acquisitions of or investments in complementary products, technologies or businesses, the use of working capital to purchase additional inventory, the timing of new product introductions, market acceptance of our products and overall economic conditions. To the extent that current and anticipated future sources of liquidity are insufficient to fund our future business activities and requirements, we may be required to seek additional equity or debt financing. In the event additional financing is required from outside sources, we may not be able to raise it on terms acceptable to us or at all.

On April 30, 2018, our Board of Directors authorized a stock repurchase program for the repurchase of up to \$60.0 million of our common stock, of which \$39.7 million was used to repurchase shares in 2018 prior to the program's expiration on December 31, 2018.

Operating Activities

Net cash provided by operating activities consists primarily of net income adjusted for certain non-cash items, including depreciation expense, stock-based compensation expense, deferred income taxes, non-cash lease expense and other non-cash (benefits) charges, net, as well as the effect of changes in working capital.

Net cash provided by operating activities was \$72.8 million in the year ended December 31, 2019, as compared to \$83.1 million in the year ended December 31, 2018. The decrease of \$10.3 million was primarily due to a \$29.9 million decrease in cash related to changes in operating assets and liabilities and an \$8.3 million decrease in non-cash expense items primarily consisting of deferred income taxes, stock-based compensation and non-cash lease expense, which was partially offset by a \$27.9 million increase in net income. Changes in cash flows related to operating assets and liabilities primarily consisted of a \$52.0 million decrease in cash due to an increased inventory balance as compared to December 31, 2018, a \$9.2 million decrease in cash due to the timing of deferred revenue and a \$4.5 million decrease in cash due to changes in our lease liabilities. These decreases were partially offset by a \$30.0 million net increase in cash due to the timing of payments associated with our accounts payable and accrued liabilities and a \$10.6 million increase in cash due to the timing of payments of income taxes.

Net cash provided by operating activities was \$83.1 million in the year ended December 31, 2018, as compared to \$61.9 million in the year ended December 31, 2017. The increase of \$21.2 million was primarily due to a \$26.9 million increase in cash related to changes in operating assets and liabilities and a \$27.9 million increase in non-cash expense items primarily consisting of stock-based compensation, depreciation expense and deferred income taxes, which was partially offset by a \$33.6 million decrease in net income. Changes in cash flows related to operating assets and liabilities primarily consisted of a \$67.3 million increase in cash due to a decreased inventory balance as compared to December 31, 2017, an \$18.5 million increase in cash due to the timing of prepaids and other assets and an \$8.9 million increase in cash due to the timing of deferred revenue. These increases were partially offset by a \$33.3 million decrease in cash due to the timing of payments of income taxes, a \$25.8 million decrease in cash due to the timing of accounts receivable collections in the fourth quarter of 2018 and an \$8.7 million decrease in cash due to the timing of payments associated with our accounts payable and accrued liabilities.

Investing Activities

Our investing activities have consisted primarily of purchases, sales and maturities of marketable securities and purchases of lab, engineering and computer equipment to support the development of new products and increase our manufacturing capacity to meet customer demand for existing products. In addition, our investing activities include expansion of, and certain improvements to, our leased facilities. We expect that we will continue to invest in these areas in line with growth in product demand.

Net cash used in investing activities in the year ended December 31, 2019 was \$103.6 million, as compared to \$56.2 million in the year ended December 31, 2018. The increase was primarily due to an increased investment of \$50.2 million, net, into marketable securities during the year ended December 31, 2019, partially offset by a \$2.8 million decrease in property and equipment purchases.

Net cash used in investing activities in the year ended December 31, 2018 was \$56.2 million, as compared to \$207.9 million in the year ended December 31, 2017. The decrease was primarily due to a decreased investment of \$152.3 million, net, into marketable securities during the year ended December 31, 2018.

Financing Activities

Our financing activities have consisted primarily of proceeds from the issuance of common stock under our stock-based compensation plans and payments to acquire treasury stock.

Net cash provided by financing activities during the year ended December 31, 2019 was \$6.9 million, as compared to net cash used in financing activities of \$33.9 million during the year ended December 31, 2018, primarily attributable to the repurchase of \$39.7 million of treasury stock in the year ended December 31, 2018 pursuant to our stock repurchase program that expired on December 31, 2018.

Net cash used in financing activities during the year ended December 31, 2018 was \$33.9 million, as compared to net cash provided by financing activities of \$5.5 million during the year ended December 31, 2017. The decrease was primarily attributable to the repurchase of \$39.7 million of treasury in the year ended December 31, 2018.

Contractual Obligations and Commitments

Our principal commitments consist of operating lease payments, purchase obligations, taxes payable as a result of the Tax Act and other tax liabilities arising from the ordinary course of business. The following table summarizes these contractual obligations at December 31, 2019. Future events could cause actual payments to differ from these estimates.

	Payments due by period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More Than 5 Years
	(in thousands)				
Operating lease liabilities, including imputed interest (1)	\$ 22,703	\$ 4,336	\$ 8,650	\$ 7,684	\$ 2,033
Purchase obligations (2)	54,276	54,276	—	—	—
Income taxes payable (3)	7,744	627	2,407	4,710	—
Unrecognized tax benefits (4)	3,585	—	—	—	—
Total	<u>\$ 88,308</u>	<u>\$ 59,239</u>	<u>\$ 11,057</u>	<u>\$ 12,394</u>	<u>\$ 2,033</u>

- (1) We lease facilities and equipment under non-cancelable operating lease agreements. Refer to Note 9, *Leases*, of the “Notes to Consolidated Financial Statements” contained in Part II, Item 8 of this Annual Report on Form 10-K for more information about our leases.
- (2) Our purchase obligations primarily consist of outstanding purchase orders with our contract manufacturers for inventory and other third parties for the manufacturing of our wafers and ASIC DSPs. Our relationships with these vendors typically allow for the cancellation of outstanding purchase orders, but require payments of all expenses incurred through the date of cancellation. Other obligations include future non-inventory purchases and commitments related to future fixed asset purchases.
- (3) Income taxes payable relates to taxes owed as a result of the one-time transition tax on earnings of certain foreign subsidiaries that were previously tax-deferred until the enactment of the Tax Act in December 2017. The Tax Act allows

the tax liability to be paid on an installment basis over eight years. The amount due in less than one year in the table above represents the transition tax amount owed in the short-term which is included in accrued liabilities on our consolidated balance sheet.

- (4) We had \$6.8 million of uncertain tax positions as of December 31, 2019. Included in the balance of unrecognized tax benefits as of December 31, 2019 are \$3.6 million of tax benefits that, if recognized, would impact the effective tax rate, which have been accrued for as a long-term liability on our consolidated balance sheet. We are not able to provide reasonably reliable estimates of future payments relating to these obligations.

Letters of Credit

As of December 31, 2019, we had outstanding letters of credit of \$0.9 million issued to cover the security deposits on the leases of the Maynard, Massachusetts, and the Holmdel, New Jersey facilities.

Off-Balance Sheet Arrangements

As of December 31, 2019, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements which have been prepared in accordance with accounting principles generally accepted in the United States of America. In preparing our consolidated financial statements, we make estimates, assumptions and judgments that can have a significant effect on our reported revenue, results of operations and net income, as well as on the value of certain assets and liabilities on our balance sheet during and as of the reporting periods. These estimates, assumptions and judgments are necessary because future events and their effects on our results and the value of our assets cannot be determined with certainty, and are made based on our historical experience and on other assumptions that we believe to be reasonable under the circumstances. These estimates may change as new events occur or additional information is obtained, and we may periodically be faced with uncertainties, the outcomes of which are not within our control and may not be known for a prolonged period of time. As the use of estimates is inherent in the financial reporting process, actual results could differ from those estimates.

Revenue Recognition

Our products are fully functional at the time of shipment and do not require production, modification or customization. We apply the following five step approach when recognizing revenue: (1) identify the contract with a customer, (2) identify the performance obligations in the contract, (3) determine the transaction price, (4) allocate the transaction price to the performance obligations in the contract and (5) recognize revenue when a performance obligation is satisfied. The contract is generally a customer purchase order and the performance obligation is to deliver a specific quantity of products at specified prices, which represents the transaction price. Our agreements with our customers do not include rights of return. We recognize revenue when transfer of control to our customers occurs, which is generally when products are shipped from our manufacturing facilities or when delivered to the customer's named location, in an amount reflecting the consideration we expect to be entitled to.

Inventories

Inventories mainly consist of raw materials and finished goods which are purchased from contract manufacturers and other suppliers. Inventories are stated at the lower of cost or net realizable value on a first-in, first-out basis. Our assessment of net realizable value requires the use of estimates, including an assessment of excess or obsolete inventories. We determine excess and obsolete inventories based on an estimate of the future demand for our products within a specified time horizon, generally 12 months. The estimates used for future demand are also used for near-term capacity planning and inventory purchases, and are consistent with revenue forecast assumptions. If our demand forecast is greater than actual demand, we may be required to record an excess inventory charge reflected in cost of goods sold, which would decrease gross profit. Any excess or obsolete inventory write-downs taken establish a new cost basis for the underlying inventory and cannot be reversed if there are subsequent increases in our demand forecast. If we are later able to sell such inventory, any related reserves would be reversed in the period of sale.

Commitments and Contingencies

In the normal course of business, we may become subject to loss contingencies, such as legal proceedings and claims arising out of our business. An accrual for a loss contingency is recognized when it is probable that an asset has been impaired or a liability has been incurred and the amount of the loss can be reasonably estimated. We expense legal costs associated with loss contingencies as they are incurred.

Income Taxes

We utilize the asset and liability method of accounting for income taxes under which we recognize deferred tax assets and liabilities for the expected future tax consequences of events that have been included in our consolidated financial statements and tax returns. Deferred tax assets and liabilities are determined based upon the differences between the financial statement carrying amounts and the tax bases of existing assets and liabilities and for loss and credit carryforwards, using enacted tax rates expected to be in effect in the year in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is not more likely than not that these assets will be realized. We recognize the benefits of uncertain tax positions that have been taken or that we expect to take on income tax returns if such tax positions are more likely than not to be sustained.

We follow the authoritative guidance regarding accounting for uncertainty in income taxes, which prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. We apply a variety of methodologies in making these estimates, including advice and studies performed by independent subject matter experts, evaluation of public actions taken by the IRS and other taxing authorities, as well as our own industry experience. We provide estimates for unrecognized tax benefits which may be subject to material adjustments until matters are resolved with taxing authorities or statutes expire. If our estimates are not representative of actual outcomes, our results of operations can be materially affected.

We must assess the likelihood that some portion or all of our deferred tax assets will be recovered from future taxable income within the respective jurisdictions, and to the extent we believe that recovery does not meet the “more-likely-than-not” standard, we must establish a valuation allowance. 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. Some sources of future taxable income are objective while others involve subjective assessments. Assessing subjective income sources involves a review of our capability and willingness to implement certain tax planning strategies that will generate future taxable income and an assessment of our experience in forecasting future taxable income. Management’s judgment is required in determining our provision for income taxes, our deferred tax assets and liabilities and any valuation allowance recorded against our net deferred tax assets. In evaluating the need for a full or partial valuation allowance, all positive and negative evidence must be considered, and the weight of that evidence, including our forecasts of taxable income over the applicable carryforward periods, our current financial performance, our market environment and other factors.

As of each reporting date, our management considers new evidence, both positive and negative, that could impact its view with regard to future realization of deferred tax assets. If we determine that our assessments on all or a portion of the deferred tax assets will change in a future period, we will record material adjustments to the provision for income taxes in that period.

We are subject to income tax in the United States as well as other tax jurisdictions in which we conduct business. On December 22, 2017, the Tax Act was signed into law making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a corporate tax rate decrease from 35% to 21% effective for tax years beginning after December 31, 2017, the transition of U.S. international taxation from a worldwide tax system to a territorial system, and a one-time transition tax on the mandatory deemed repatriation of cumulative foreign earnings as of December 31, 2017. Earnings from non-U.S. activities are subject to local country income tax. As a result of the concept of “deemed distributions” under the Tax Act, the impact of global intangible low-tax income on our future foreign earnings, and lack of certain foreign governments’ withholding tax imposed on dividends, we no longer take the position that most of our foreign earnings are permanently reinvested. For certain foreign operating subsidiaries, we continue to take the position that earnings are permanently reinvested.

Stock-Based Compensation

We recognize compensation expense for equity awards based on the grant date fair value of the award. For equity awards that vest based on a service condition, which constitute the majority of our outstanding equity awards, stock-based compensation expense is recognized on a ratable basis over the requisite service period. When an equity award contains a performance and/or market condition, we recognize stock-based compensation expense utilizing the accelerated attribution method.

We use the Black-Scholes option pricing model to measure the fair value of our option awards when they are granted. Prior to our IPO, we estimated the value of common stock at the grant date with the help of an independent third-party service provider. The expected volatility of employee option awards prior to 2017 was determined using the daily historical volatility of companies we consider to be our peers. For options awarded in 2018, we determined expected volatility using a blend of our historical volatility and the historical volatility of our peers. To determine our peer companies, we used the following criteria: optical telecommunications companies; similar histories and relatively comparable financial leverage; sufficient public company trading history; and in similar businesses and geographical markets. We used the stock price volatility over the expected term of our granted options to calculate the expected volatility. The expected term of employee option awards is determined using the average midpoint between vesting and the contractual term for outstanding awards, or “the simplified method,” because we do not yet have a sufficient history of option exercises. We determine the risk-free interest rate on the grant date of the award based on the rate of U.S. Treasury securities with maturities approximately equal to the estimated expected term of the awards. We have not paid dividends and do not anticipate paying a cash dividend in the foreseeable future and, accordingly, use an expected dividend yield of zero.

The following table summarizes the assumptions, other than fair value of our common stock, relating to our stock options granted in the year ended December 31, 2018. No stock options were granted in the years ended December 31, 2019 and 2017.

	Year Ended December 31, 2018
Risk-free interest rate	2.9%
Expected dividend yield	None
Expected volatility	53.5%
Expected term (in years)	6.3

We will continue to use judgment in evaluating the expected volatility and expected term utilized in our stock-based compensation expense calculations on a prospective basis. As we continue to accumulate additional data related to our common stock, we may refine our estimates of expected volatility and expected term, which could materially affect our future stock-based compensation expense to the extent we grant future stock option awards.

Stock-based compensation is measured using the fair value of our common stock on the grant date for time-vested restricted stock units, or RSUs. During the years ended December 31, 2019, 2018 and 2017 we granted RSU awards to executives which had a market condition or a market and a performance condition, in addition to a service condition. Determining the amount of stock-based compensation to be recorded for these awards requires us to develop estimates to be used in calculating the grant-date fair value of the awards. We calculate the grant-date fair value of these awards using the Monte Carlo simulation valuation model. The Monte Carlo simulation model utilizes multiple input variables that determine the probability of satisfying the market or performance conditions stipulated in the award grant and calculates the fair market value for the awards granted. The Monte Carlo simulation model also uses stock price volatility and other variables to estimate the probability of satisfying the market or performance conditions, including the possibility that the market condition may not be satisfied, and the resulting fair value of the award. We use a blended rate of our actual historical volatility and our peers volatility to determine the volatility input in the Monte Carlo simulation model. For the performance-based RSUs, we also estimate the fair value using management’s best estimate of whether it is probable or not probable that the performance objective will be satisfied, which is reassessed at each reporting period.

The expense related to these awards is recognized on an accelerated basis over the vesting period of the awards which can vary. See Note 11, *Stock Compensation Plans* of the “Notes to Consolidated Financial Statements” contained in Part II, Item 8 of this Annual Report on Form 10-K for more information related to these market-based and performance-based awards.

Recent Accounting Pronouncements

Refer to Note 3, *Summary of Significant Accounting Policies* of the “Notes to Consolidated Financial Statements” contained in Part II, Item 8 of this Annual Report on Form 10-K for analysis of recent accounting pronouncements that are applicable to our business.

Item 7A. *Quantitative and Qualitative Disclosures About Market Risk*

Market risk is the risk of loss to future earnings, values or future cash flows that may result from changes in the price of a financial instrument. The value of a financial instrument may change as a result of changes in interest rates, exchange rates,

commodity prices, equity prices and other market changes. We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate and foreign currency risks as follows:

Interest Rate Sensitivity

Our exposure to changes in interest rates relates primarily to interest earned on and the market value of our cash, cash equivalents and marketable securities. Our cash, cash equivalents and marketable securities consist of bank deposit accounts, money market funds, U.S. government agency debt securities, commercial paper, certificates of deposit, asset-backed securities and corporate debt securities. Our securities with fixed interest rates may have their market value adversely impacted by a rise in interest rates. As a result, we may suffer losses in principal if we are forced to sell securities that decline in market value due to changes in interest rates. However, because we classify our investments in debt securities as available-for-sale, no gains or losses are recognized in the consolidated income statements unless such securities are sold prior to maturity or incur an other-than-temporary decline in fair value. An immediate 100 basis point change in interest rates would have a \$2.4 million effect on the fair market value of our portfolio as of December 31, 2019. Our investment policy specifies credit quality standards for our investments and limits the amount of credit exposure from any single issue, issuer or type of investment.

Foreign Currency Exchange Risk

We are exposed to market risk related to changes in foreign currency exchange rates. Our operations outside of the United States incur a portion of their operating expenses in foreign currencies, principally the Euro, but these expenses are immaterial compared to our overall expenses. To date, the majority of our product sales and inventory purchases have been denominated in U.S. dollars. In addition, the functional currency of all of our entities is the U.S. dollar. Accordingly, we have limited exposure to foreign currency exchange rates. During the years ended December 31, 2019, 2018 and 2017, we recorded foreign currency transaction losses of \$0.2 million, \$0.4 million and \$0.2 million, respectively. These foreign currency transaction losses have been recorded as a component of "other expense, net" in our consolidated income statements. We believe that a 10% change in the exchange rate between the U.S. dollar and Euro would not materially impact our operating results or financial position. To date, we have not entered into any foreign currency exchange contracts. In future periods, we may hedge certain significant transactions denominated in currencies other than the U.S. dollar as we expand our international operations.

Inflation Risk

We do not believe that inflation has had a material effect on our business. However, if global demand for the base materials utilized in our suppliers' components were to significantly increase for the components we purchase from our suppliers to manufacture our products, our costs could become subject to significant inflationary pressures, and we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could harm our business, operating results and financial condition.

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 Acacia Communications, Inc.:

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Acacia Communications, Inc. and subsidiaries (the “Company”) as of December 31, 2019 and 2018, the related statements of income, statements of comprehensive income, stockholders’ equity, and cash flows, for each of the three years in the period ended December 31, 2019, 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, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, 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, 2019, 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 February 18, 2020, expressed an unqualified opinion on the Company’s internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 3 to the financial statements, effective January 1, 2019, the Company adopted FASB Accounting Standards Update 2016-02 *Leases* using the modified retrospective approach.

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 US 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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Legal Contingencies - Refer to Notes 8 and 13 to the financial statements

Critical Audit Matter Description

The Company is involved in litigation with ViaSat, Inc. that alleges breach of contract, breach of the implied covenant of good faith and fair dealing, and misappropriation of trade secrets. Legal loss contingencies are evaluated based on the likelihood of the Company incurring a liability and whether a loss or range of losses is reasonably estimable. The likelihood and amount of a loss or range of losses are estimated based on the progression of settlement discussions, legal and expert fees, and the Company’s historical litigation experience.

In July 2019, a jury returned a verdict, which awarded damages of \$49.3 million to ViaSat, Inc. In December 2019, the Company filed a notice of appeal of the judgment. In assessing whether the Company should accrue a liability in its financial statements as a result of the lawsuit, the Company considered various factors, including the numerous legal, technical, and factual issues involved in the lawsuit. The Company has recorded a provision of \$20 million in litigation and settlement-related accruals based on management's assessment of currently available information.

We identified this contingent liability and disclosure related to the ViaSat, Inc. litigation as a critical audit matter because management's evaluation of the potential outcomes of the ViaSat, Inc. litigation, including settlement and appeal, involves significant judgment. Our consideration of management's evaluation requires a high degree of auditor judgment and an increased extent of effort when performing audit procedures to evaluate the Company's assertions regarding probable and estimable losses as of December 31, 2019.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the evaluation of the ViaSat, Inc. legal contingency included the following, among others:

- We tested the effectiveness of controls related to evaluating legal loss contingencies, including those over the review of the ViaSat, Inc. legal matter.
- We held discussions with internal and external legal counsel to understand developments in the related legal matters and progression in potential settlement discussions.
- We requested and received a written response from internal and external legal counsel as it relates to the lawsuit.
- We read Board of Directors' meeting minutes for evidence of further considerations indicative of unrecorded contingencies.
- We evaluated the assumptions used by the Company to estimate the litigation and settlement accrual, including corroborating the assumptions with internal and external legal counsel.
- We evaluated the Company's legal contingency disclosure for consistency with our knowledge of the lawsuit.

Income Taxes: Uncertain Tax Positions - Refer to Note 14 to the financial statements

Critical Audit Matter Description

In June 2019, the Ninth Circuit Court of Appeals ruled in *Altera Corp. vs. Commissioner* (the "Altera Case") in favor of the Internal Revenue Service (IRS). This ruling upheld certain cost-sharing regulations relating to the treatment of stock-based compensation expense in an intercompany cost-sharing arrangement. At present, the Company's uncertain tax position liability does not include amounts related to this matter as the Company has concluded its position is more likely than not to be sustained upon audit. The Company has estimated the potential liability would be approximately \$6.3 million as of December 31, 2019.

Conclusions on recognizing and measuring an uncertain tax position related to the *Altera Case* involve significant estimates and management judgment and include complex considerations of the Internal Revenue Code, related regulations, tax and appellate case law, and prior-year audit settlements. Given the complexity and the subjective nature of the transfer pricing issues that remain unresolved with the IRS through the *Altera Case*, evaluating management's estimates relating to its determination of uncertain tax positions required extensive audit effort and a high degree of auditor judgment, including involvement of our tax specialists.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures to evaluate the Company's estimates of uncertain tax positions related to unresolved transfer pricing issues arising from the *Altera Case* included the following, among others:

- We tested the effectiveness of controls relating to the identification, recognition, measurement, and disclosure of uncertain tax positions.

- We evaluated the appropriateness and consistency of management’s methods and assumptions used in the identification, recognition, measurement, and disclosure of uncertain tax positions related to certain transfer pricing positions.
- With the assistance of tax specialists, we evaluated the reasonableness of management’s estimates by considering how tax law, including statutes, regulations, and case law, affected management’s judgments.
- We evaluated the Company’s income tax disclosures for consistency with our knowledge of the Company’s position and exposure to an unfavorable decision in the *Altera* Case.

/s/ Deloitte & Touche LLP

Boston, Massachusetts
February 18, 2020

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

ACACIA COMMUNICATIONS, INC.
CONSOLIDATED BALANCE SHEETS
(in thousands, except per share amounts)

	December 31, 2019	December 31, 2018
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 36,617	\$ 60,444
Marketable securities - short-term	300,129	264,660
Accounts receivable	97,948	90,831
Inventory	40,820	25,511
Prepaid expenses and other current assets	6,518	12,598
Total current assets	482,032	454,044
Marketable securities - long term	134,632	74,764
Property and equipment, net	26,801	26,643
Operating lease right-of-use assets	25,046	—
Deferred tax asset	51,798	38,717
Other assets	1,106	7,691
Total assets	\$ 721,415	\$ 601,859
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 46,957	\$ 46,650
Accrued liabilities	61,680	31,848
Deferred revenue	4,483	5,101
Total current liabilities	113,120	83,599
Income taxes payable	7,117	8,791
Non-current operating lease liabilities	15,726	—
Other long-term liabilities	7,029	6,742
Total liabilities	142,992	99,132
Commitments and contingencies (Note 13)		
Stockholders' equity:		
Preferred stock, \$0.0001 par value; 5,000 shares authorized; none issued and outstanding at December 31, 2019 and 2018	—	—
Common stock, \$0.0001 par value; 150,000 shares authorized; 42,399 and 41,024 shares issued at December 31, 2019 and 2018, respectively	4	4
Treasury stock, at cost; 974 shares at December 31, 2019 and 2018, respectively	(39,712)	(39,712)
Additional paid-in capital	402,032	360,267
Accumulated other comprehensive income (loss)	720	(372)
Retained earnings	215,379	182,540
Total stockholders' equity	578,423	502,727
Total liabilities and stockholders' equity	\$ 721,415	\$ 601,859

The accompanying notes are an integral part of these consolidated financial statements.

ACACIA COMMUNICATIONS, INC.
CONSOLIDATED INCOME STATEMENTS
(in thousands, except per share amounts)

	Year Ended December 31,		
	2019	2018	2017
Revenue	\$ 464,663	\$ 339,891	\$ 385,166
Cost of revenue	243,981	192,771	217,326
Gross profit	220,682	147,120	167,840
Operating expenses:			
Research and development	128,700	102,406	92,027
Sales, general and administrative	80,581	51,864	38,807
Gain on disposal of property and equipment	—	—	(47)
Total operating expenses	209,281	154,270	130,787
Income (loss) from operations	11,401	(7,150)	37,053
Other income, net:			
Interest income, net	10,413	7,209	3,389
Other expense, net	(173)	(463)	(139)
Total other income, net	10,240	6,746	3,250
Income (loss) before (benefit) provision for income taxes	21,641	(404)	40,303
(Benefit) provision for income taxes	(11,198)	(5,320)	1,795
Net income	\$ 32,839	\$ 4,916	\$ 38,508
Earnings per share:			
Basic	\$ 0.80	\$ 0.12	\$ 0.99
Diluted	\$ 0.77	\$ 0.12	\$ 0.92
Weighted-average shares used to compute earnings per share:			
Basic	40,883	40,259	38,920
Diluted	42,554	41,997	41,690

The accompanying notes are an integral part of these consolidated financial statements.

ACACIA COMMUNICATIONS, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Year Ended December 31,		
	2019	2018	2017
Net income	\$ 32,839	\$ 4,916	\$ 38,508
Other comprehensive income (loss):			
Changes in unrealized loss on marketable securities, net of income taxes of \$(89), \$(18) and \$118 for the years ended December 31, 2019, 2018 and 2017, respectively	1,092	(7)	(304)
Comprehensive income	\$ 33,931	\$ 4,909	\$ 38,204

The accompanying notes are an integral part of these consolidated financial statements.

ACACIA COMMUNICATIONS, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Retained Earnings	Total
	Shares	Amount	Shares	Amount				
Balance at January 1, 2017	37,998	\$ 4	—	\$ —	\$ 295,893	\$ (16)	\$ 138,914	\$ 434,795
Vesting of restricted common stock	85							—
Exercise of common stock options	699	—			2,755			2,755
Vesting of restricted stock units	745	—			—			—
Common stock issued under employee stock purchase plan	79	—			2,923			2,923
Stock-based compensation expense					23,373			23,373
Changes in unrealized loss on marketable securities, net of tax of \$118						(304)		(304)
Net income							38,508	38,508
Balance at December 31, 2017	39,606	\$ 4	—	\$ —	\$ 324,944	\$ (320)	\$ 177,422	\$ 502,050
Effect of adopted accounting standards						(45)	202	157
Treasury stock acquired			974	(39,712)				(39,712)
Vesting of restricted common stock	21							—
Exercise of common stock options	489	—			2,512			2,512
Vesting of restricted stock units	782	—			—			—
Common stock issued under employee stock purchase plan	126	—			3,301			3,301
Stock-based compensation expense					29,510			29,510
Changes in unrealized loss on marketable securities, net of tax of (\$18)						(7)		(7)
Net income							4,916	4,916
Balance at December 31, 2018	41,024	\$ 4	974	\$ (39,712)	\$ 360,267	\$ (372)	\$ 182,540	\$ 502,727
Exercise of common stock options	382	—			2,658			2,658
Vesting of restricted stock units	890	—			—			—
Common stock issued under employee stock purchase plan	103	—			4,275			4,275
Stock-based compensation expense					34,832			34,832
Changes in unrealized loss on marketable securities, net of tax of (\$89)						1,092		1,092
Net income							32,839	32,839
Balance at December 31, 2019	42,399	\$ 4	974	\$ (39,712)	\$ 402,032	\$ 720	\$ 215,379	\$ 578,423

The accompanying notes are an integral part of these consolidated financial statements.

ACACIA COMMUNICATIONS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2019	2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net income	\$ 32,839	\$ 4,916	\$ 38,508
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	12,559	13,646	12,280
Gain on disposal of property and equipment	—	—	(47)
Stock-based compensation	35,153	29,593	23,373
Deferred income taxes	(13,081)	3,133	(18,368)
Non-cash lease expense	4,872	—	—
Other non-cash (benefits) charges	(2,244)	(799)	446
Changes in operating assets and liabilities:			
Accounts receivable	(7,117)	(4,229)	21,525
Inventory	(15,309)	36,721	(30,551)
Prepaid expenses and other current assets	6,080	6,219	(6,540)
Other assets	(302)	1,113	(4,618)
Accounts payable	(835)	1,377	(2,371)
Accrued liabilities	26,750	(5,467)	6,957
Deferred revenue	(881)	8,357	(548)
Income taxes payable	(1,674)	(12,243)	21,034
Lease liabilities	(4,541)	—	—
Other long-term liabilities	550	748	813
Net cash provided by operating activities	<u>72,819</u>	<u>83,085</u>	<u>61,893</u>
CASH FLOWS FROM INVESTING ACTIVITIES:			
Purchases of property and equipment	(11,837)	(14,660)	(14,112)
Purchases of marketable securities	(476,207)	(382,438)	(436,594)
Sales and maturities of marketable securities	384,467	340,920	242,735
Deposits	(2)	(59)	64
Net cash used in investing activities	<u>(103,579)</u>	<u>(56,237)</u>	<u>(207,907)</u>
CASH FLOWS FROM FINANCING ACTIVITIES:			
Payment of public offering costs	—	—	(201)
Treasury stock acquired	—	(39,712)	—
Proceeds from the issuance of common stock under stock-based compensation plans	6,933	5,813	5,678
Net cash provided by (used in) financing activities	<u>6,933</u>	<u>(33,899)</u>	<u>5,477</u>
Net decrease in cash, cash equivalents and restricted cash	(23,827)	(7,051)	(140,537)
Cash, cash equivalents and restricted cash—Beginning of period	60,444	67,495	208,032
Cash, cash equivalents and restricted cash—End of period	<u>\$ 36,617</u>	<u>\$ 60,444</u>	<u>\$ 67,495</u>
Supplemental cash flow disclosures:			
(Refunds received) cash paid for income taxes, net	\$ (129)	\$ (5,053)	\$ 1,465
Supplemental disclosure of non-cash investing and financing activities:			
Right-of-use assets acquired under operating leases	\$ 7,084	\$ —	\$ —
Capital expenditures incurred but not yet paid	\$ 1,338	\$ 196	\$ 2,742

The accompanying notes are an integral part of these consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. NATURE OF THE BUSINESS AND OPERATIONS

Acacia Communications, Inc. was incorporated on June 2, 2009, as a Delaware corporation. Acacia Communications, Inc. and its wholly-owned subsidiaries (the “Subsidiaries”) are collectively referred to as the Company. The Company’s mission is to deliver high-speed coherent optical interconnect products that transform communications networks relied upon by cloud infrastructure operators and content and communication service providers, through improvements in performance and capacity and reductions in associated costs. By implementing optical interconnect technology in a silicon-based platform, a process the Company refers to as the siliconization of optical interconnect, the Company believes it is leading a disruption that is analogous to the computing industry’s integration of multiple functions into a microprocessor. The Company’s products fall into three product groups: embedded modules, pluggable modules and semiconductors. The Company’s embedded module and pluggable module product groups consist of optical interconnect modules with transmission speeds ranging from 100 to 1,200 gigabits per second (“Gbps”) for use in long-haul, metro and inter-data center markets. The Company’s semiconductor product group consists of its low-power coherent digital signal processor application-specific integrated circuits (“DSP ASICs”) and its silicon photonic integrated circuits (“silicon PICs”) which are either integrated into the Company’s embedded and pluggable modules or sold to customers on a standalone basis for integration into internally developed or other merchant modules. The Company is also developing a 400ZR module that will expand its pluggable module product group, and enable inter-data center transmission capacity of 400 Gbps in the same compact pluggable form factors used for 400G client optics, including QSFP-DD and OSFP. The Company’s modules perform a majority of the digital signal processing and optical functions in optical interconnects and offer low power consumption, high density and high speeds at attractive price points. Through the use of standard interfaces, the Company’s modules can be easily integrated with customers’ network equipment. The advanced software in the Company’s modules enables increased configurability and automation, provides insight into network and connection point characteristics and helps identify network performance problems, all of which increase flexibility and reduce operating costs.

The Company is headquartered in Maynard, Massachusetts, and has wholly-owned subsidiaries in North America, Europe and Asia.

Proposed Merger with Cisco Systems

On July 8, 2019, the Company, Cisco Systems, Inc., a California corporation (the “Parent”), and Amarone Acquisition Corp., a Delaware corporation and a wholly owned subsidiary of the Parent (the “Merger Sub”), entered into an Agreement and Plan of Merger (the “Merger Agreement”), pursuant to which, among other things, the Merger Sub will be merged with and into the Company (the “Merger”), with the Company surviving the Merger as a wholly owned subsidiary of the Parent. The Merger Agreement was adopted by the Company’s stockholders at a special meeting held on September 6, 2019. Completion of the Merger is subject to customary closing conditions, including (i) obtaining certain foreign antitrust approvals, including in China, (ii) the absence of governmental injunctions or other legal restraints prohibiting the Merger or imposing certain antitrust restraints and (iii) the absence of a “Material Adverse Effect,” as defined in the Merger Agreement. The Company and the Parent have already received antitrust clearance for the Merger in the United States, Austria and Germany. If the Merger is completed, each share of the Company’s common stock issued and outstanding immediately prior to the effective time of the Merger, subject to certain exceptions, will be converted into the right to receive \$70.00 in cash. Subject to the satisfaction of these conditions, the parties expect the Merger to close in the second half of the Parent’s 2020 fiscal year which ends on July 25, 2020.

For additional information related to the Merger Agreement, refer to the Company’s Current Report on Form 8-K filed with the Securities and Exchange Commission on July 9, 2019, which includes the full text of the Merger Agreement as Exhibit 2.1.

During the year ended December 31, 2019, the Company recorded acquisition-related costs of \$7.6 million in sales, general and administrative expenses within our consolidated income statements.

2. BASIS OF PRESENTATION

Principles of Consolidation

The accompanying consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“GAAP”) and include the accounts of Acacia Communications, Inc., and its Subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with 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 consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

Comprehensive Income

Comprehensive income consists of two components, net income and other comprehensive income (loss). Other comprehensive income (loss) refers to income or losses that are recorded as an element of stockholders' equity but are excluded from net income. The Company's other comprehensive income (loss) consists of net unrealized gains and losses on available-for-sale securities, net of the related tax effect.

3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Revenue Recognition and Deferred Revenue

The Company adopted Accounting Standard Update ("ASU") 2014-09, *Revenue from Contracts with Customers (Topic 606)* ("ASC 606") issued by the Financial Accounting Standards Board ("FASB") effective January 1, 2018 using the modified retrospective method. As a result, the Company is required to disclose the accounting policies in effect prior to January 1, 2018, as well as the policies it has applied starting January 1, 2018.

Periods prior to January 1, 2018

The Company derives its revenue from the sale of its products. The Company recognized revenue when persuasive evidence of an arrangement existed, delivery had occurred, the fee was fixed or determinable and collectability of the related receivable was reasonably assured. The Company considered delivery of its products to have occurred once title and risk of loss had been transferred. The Company's products consist of hardware and software that function together to deliver the products' essential functionality. The Company does not sell its software on a standalone basis.

At the time revenue is recognized, the Company establishes an accrual for estimated warranty expenses associated with sales, recorded as a component of cost of revenue. The Company's customers generally do not have return rights.

A limited number of revenue arrangements with the Company's customers included more than one element and required the application of ASC 605-25, Revenue Recognition—Multiple Element Arrangements. Arrangement consideration was allocated to each element with standalone value based on the relative selling prices of all of the elements in the arrangement using the fair value hierarchy.

The Company determined the relative selling price of elements based on prices charged for standalone products, when sufficiently concentrated, and third-party evidence of similar elements, or, in the absence of these sources of evidence, based on management's best estimate of selling price. Revenue recognized from multiple-element arrangements accounted for less than 1% of the Company's total revenue during the year ended December 31, 2017.

Deferred revenue represented either advance payments from customers or billings to customers for which the revenue recognition criteria had not been met. Deferred product costs represented products that had been billed to customers, for which the revenue associated with the arrangement had been deferred as a result of not meeting the revenue recognition criteria. The Company deferred the product costs until recognition of the related revenue occurred.

Periods commencing January 1, 2018 and after

The Company generates all of its revenue from contracts with customers. The Company considers customer purchase orders, which in many cases are governed by master purchasing agreements, to be contracts with customers. The Company's contracts with customers are generally for product only, and do not include other performance obligations such as services, extended warranties or other material rights. As part of its assessment of each contract, the Company evaluates certain factors including the customer's ability to pay (or credit risk). For each contract, the Company considers the promise to transfer products, each of which is distinct, to be the identified performance obligations. In determining the transaction price, the price stated on the purchase order is typically fixed and represents the net consideration to which the Company expects to be entitled, and therefore there is no variable consideration. As the Company's standard payment terms are less than one year, the Company has elected, as a practical expedient, to not assess whether a contract has a significant financing component. The Company

allocates the transaction price to each distinct product based on its relative standalone selling price. The product price as specified on the purchase order is considered the standalone selling price as it is an observable source that depicts the price as if sold to a similar customer in similar circumstances. Revenue is recognized when control of the product is transferred to the customer (i.e., when the Company's performance obligation is satisfied), which typically occurs upon shipment from the Company's manufacturing site or delivery to the customer's named location. In determining whether control has transferred, the Company considers if there is a present right to payment from the customer and when physical possession, legal title and risks and rewards of ownership have transferred to the customer. The Company also considered certain customer contracts that include acceptance clauses, but has concluded that delivery to the customer's named location is the point at which the customer is able to direct the use of, and obtain substantially all of the remaining benefits from, the asset, and therefore the acceptance is considered a formality that does not impact the timing of revenue recognition.

The Company generally provides an assurance warranty that its products will substantially conform to the agreed-upon specifications for 12 to 24 months from the date of shipment. The Company's liability is limited to the cost of repair or replacement of the defective part. The Company does not consider activities related to such warranties to be a separate performance obligation. The terms and conditions of sale generally do not allow for refunds or product returns other than for warranty repairs.

The Company has a limited number of customer contracts that provide for the performance of services or include multiple performance obligations. Once the Company determines the performance obligations, the Company determines the transaction price, which includes estimating the amount of variable consideration to be included in the transaction price, if any. The Company then allocates the transaction price to each performance obligation in the contract based on a relative stand-alone selling price method or using the variable consideration allocation exception if the required criteria are met. The corresponding revenues are recognized as the related performance obligations are satisfied.

A receivable is recognized in the period the Company ships the product. Payment terms on invoiced amounts are based on contractual terms with each customer. In some cases, if control of the product has not yet transferred to the customer or the timing of the payments made by the customer precedes the Company's fulfillment of the performance obligation, the Company recognizes a contract liability that is classified as "deferred revenue." Deferred product costs represent products that have been billed to customers, for which the revenue associated with the arrangement has been deferred as a result of not meeting the revenue recognition criteria. The Company defers the product costs until recognition of the related revenue occurs.

The Company has concluded that none of the costs it has incurred to obtain and fulfill its ASC 606 contracts meet the capitalization criteria, and as such, there are no costs deferred and recognized as assets on the consolidated balance sheet as of December 31, 2019 and 2018.

Cost of Revenue

The Company records all costs associated with its product sales in cost of revenue. These costs include the cost of materials, contract manufacturing fees, impacts of manufacturing yield, shipping costs and quality assurance. Cost of revenue also includes indirect costs such as warranty, excess and obsolete inventory charges, general overhead costs and depreciation.

Financial Instruments

Cash equivalents include all highly liquid investments with an original maturity of three months or less upon acquisition. Cash equivalents may consist of bank deposit accounts, money market funds, commercial paper, certificates of deposit, asset-backed securities and corporate debt securities.

The Company's marketable debt securities have been classified and accounted for as available-for-sale. Management determines the appropriate classification of its investments at the time of purchase and reevaluates the classifications at each balance sheet date. The Company classifies its investments in marketable debt securities as either short-term or long-term based on each instrument's underlying contractual maturity date. The Company's investments in marketable debt securities are carried at fair value, with unrealized gains and losses, net of taxes, reported as a component of accumulated other comprehensive income (loss) in stockholders' equity, with the exception of unrealized losses believed to be other-than-temporary which are reported in earnings in the current period.

Concentrations of Credit Risk

Financial instruments that subject the Company to significant concentrations of credit risk consist primarily of cash and cash equivalents, marketable securities and accounts receivable. The majority of the Company's cash and cash equivalents are

at two financial institutions and the balances often exceed federally insured limits. Management believes that the financial institutions that hold the Company's cash and cash equivalents are financially creditworthy and, accordingly, minimal credit risk exists with respect to those balances.

Marketable securities consist of investments in U.S. treasury bonds, commercial paper, certificates of deposit, asset-backed securities and corporate debt securities. The main objective of the Company's current investment policy is to preserve capital and maintain liquidity. The Company seeks to limit the amount of investments in any single issuer. As a result, the Company believes that, as of December 31, 2019 and 2018, its concentration of credit risk related to marketable securities was not significant.

To minimize credit risk related to accounts receivable, ongoing credit evaluations of customers' financial condition are performed and the Company maintains allowances for potential credit losses as needed. The Company has determined that no allowance is needed as of December 31, 2019 and 2018, as all accounts receivable balances are expected to be collected.

Inventory

Inventory, which consists of raw materials, work-in-process, and finished goods, is stated at the lower of cost or net realizable value, as determined on a specific cost basis and using the first-in, first-out convention. The Company reduces the carrying value of inventory to its estimated net realizable value for those items that are potentially excess, obsolete or slow moving based on changes in customer demand, technology developments or other economic factors. Such reductions in the carrying value of inventory are recorded within cost of revenue in the consolidated income statements. Any excess or obsolete inventory write-downs taken establish a new cost basis for the underlying inventory and cannot be reversed if there are subsequent increases in the Company's demand forecast. If the Company is later able to sell such inventory, any related reserves would be reversed in the period of sale.

Property and Equipment

Property and equipment are recorded at cost and depreciated using the straight-line method over the estimated useful lives of the related assets. The costs of additions and improvements are capitalized, while maintenance and repairs are charged to expense as incurred. The estimated useful lives of the Company's property and equipment are as follows:

Engineering laboratory equipment	3-7 years
Computer software	1-3 years
Computer equipment	3 years
Furniture and fixtures	3-7 years
Leasehold improvements	Lesser of lease term or life of asset

When assets are retired or otherwise disposed of, the assets and related accumulated depreciation are derecognized from the accounts and the resulting gain or loss is reflected in the consolidated income statements.

Leases

The Company determines if an arrangement is a lease at inception. Operating leases are included in operating lease right-of-use ("ROU") assets, accrued liabilities, and noncurrent operating lease liabilities in the Company's consolidated balance sheets. ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As most of the Company's leases do not provide an implicit rate, the Company uses its incremental borrowing rate based on the estimated rate of interest for collateralized borrowing over a similar term of the lease payments at commencement date. The Company's lease terms do not include options to extend or terminate leases unless the Company is reasonably certain that it will exercise those options. Lease expense for lease payments is recognized on a straight-line basis over the lease term. The Company has elected not to separate nonlease components from associated lease components for its real estate lease assets.

Impairment of Long-Lived Assets

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the asset may not be recoverable. When such events occur, the Company compares the carrying amounts of the

assets to their estimated undiscounted future cash flows. If this comparison indicates that there is an impairment, the amount of the impairment is calculated as the difference between the carrying value and the fair value. The Company recorded \$0.3 million of impairments in the year ended December 31, 2019. No impairments were recognized for the years ended December 31, 2018 and 2017.

Warranties

The Company's standard warranty obligation to its customers provides for repair or replacement of a defective product at the Company's discretion for a period of time following purchase, generally between 12 and 24 months. Factors that affect the warranty obligation include product failure rates, material usage and service delivery costs incurred in correcting product failures. In addition, from time to time, specific warranty accruals may be made if unforeseen technical problems arise. The estimated cost associated with fulfilling the Company's warranty obligation to customers is recorded in cost of revenue. Refer to Note 13 for additional information regarding warranty activity.

Commitments and Contingencies

In the normal course of business, the Company may become subject to loss contingencies, such as legal proceedings and claims arising out of its business. An accrual for a loss contingency is recognized when it is probable that an asset has been impaired or a liability has been incurred and the amount of the loss can be reasonably estimated. The Company expenses legal costs associated with loss contingencies as they are incurred.

Advertising Costs

The Company expenses advertising costs as incurred. During the year ended December 31, 2019, the Company incurred \$0.2 million of advertising expenses. In the years ended December 31, 2018 and 2017, the Company did not incur any advertising expenses.

Research and Development Costs

The Company expenses all research and development costs as incurred. Research and development costs consist primarily of salary and benefit expenses, including stock-based compensation, for employees, costs for contractors engaged in research, design and development activities, costs incurred directly and with support from external vendors, such as outsourced development costs, as well as support costs for prototypes, depreciation, purchased intellectual property, facilities and travel.

Stock-Based Compensation

The Company accounts for share-based payment awards granted to employees at fair value, which is measured using the fair value of the Company's common stock on the grant date for time-vested restricted stock units ("RSUs"). Other input assumptions are used to determine the valuation of performance- or market-based RSU awards, as well as in the Black-Scholes option-pricing model for stock option awards and employee stock purchase rights. The measurement date for the fair value of employee awards is the date of grant. For all time-vested awards, stock-based compensation costs are recognized as expense on a ratable basis over the requisite service period, which is generally the vesting period. For awards with market and/or performance conditions, the Company recognizes stock-based compensation expense using the accelerated attribution method.

Foreign Currency Transactions

The functional currency of the Company's Subsidiaries is the U.S. dollar. All monetary assets and liabilities denominated in a foreign currency are revalued into U.S. dollars at the exchange rate on the consolidated balance sheet date. When transactions are required to be paid in the local currency of any Subsidiary, any resulting foreign currency transaction gain or loss is recorded as a component of other expense, net, in the consolidated income statements. To date, foreign currency transaction gain or loss associated with the Company's Subsidiaries has not been significant. During the years ended December 31, 2019, 2018 and 2017, the Company recorded foreign currency transaction losses of \$0.2 million, \$0.4 million and \$0.2 million, respectively.

Income Taxes

The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the Company's consolidated financial statements and tax returns. Deferred tax assets and liabilities are determined based upon the differences between the financial statement carrying amounts and the tax bases of existing assets

and liabilities and for loss and credit carryforwards, using enacted tax rates expected to be in effect in the year in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is not more likely than not that these assets will be realized.

The Company accrues liabilities for potential payments of tax to various tax authorities related to uncertain tax positions. Liabilities are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filings or positions is more likely than not to be realized following resolution of any potential uncertainties related to the tax benefit. Potential interest and penalties associated with such uncertain tax positions are recorded as a component of the provision for income taxes, if applicable. As of December 31, 2019 and 2018, the Company identified \$6.8 million and \$5.0 million of gross uncertain tax positions, respectively. Included in those balances as of December 31, 2019 and 2018 are \$3.6 million and \$3.0 million of tax benefits, respectively, that, if recognized, would impact the effective tax rate. These have been accrued for as long-term liabilities on the Company's consolidated balance sheets.

Operating Segments

The Company operates as one operating segment. Operating segments are defined as components of an enterprise for which separate financial information is regularly evaluated by the chief operating decision maker ("CODM"), which is the Company's chief executive officer, in deciding how to allocate resources and assess performance. The Company's CODM evaluates the Company's financial information for the purpose of allocating resources and assessing the performance of these resources on a consolidated basis.

Revenue by geographic country, based on ship-to destinations, which in certain instances may be the location of a contract manufacturer rather than the Company's end customer, was as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
United States	\$ 70,702	\$ 56,839	\$ 60,723
China	159,637	98,906	148,431
Germany	57,657	58,711	57,051
Thailand	82,413	68,217	48,016
Other	94,254	57,218	70,945
Total revenue	<u>\$ 464,663</u>	<u>\$ 339,891</u>	<u>\$ 385,166</u>

Total long-lived assets by geographic country consisted of the following as of December 31, 2019 and 2018 (in thousands):

	December 31,	
	2019	2018
United States	\$ 18,325	\$ 18,123
Thailand	3,870	4,147
China	1,949	1,703
Other	2,657	2,670
Total long-lived assets	<u>\$ 26,801</u>	<u>\$ 26,643</u>

Recently Adopted Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)* ("ASC 842") which requires lessees to recognize a right-of-use ("ROU") asset and lease liability on the balance sheet for virtually all leases. From a lessee perspective, ASC 842 retains a dual-model requiring leases to be classified as either operating or financing leases for the income statement. Operating leases will result in straight-line expense and financing leases will have a front-loaded expense pattern with an interest expense component. On January 1, 2019, the Company adopted ASC 842 and all related amendments using the modified retrospective approach and the ASC 842 effective date as the date of initial application. The comparative prior period information has not been restated and continues to be reported under the accounting standards in effect for those periods. Adoption of ASC 842 resulted in the recording of lease ROU assets and lease liabilities of approximately \$21.5 million and \$16.0 million, respectively, as of January 1, 2019. The difference between the ROU assets and lease liabilities relates to deferred and prepaid rent balances which are now included as part of the ROU assets. The adoption of ASC 842 did not materially impact the

Company's consolidated income statements. In accordance with ASC 842, the Company determined if an arrangement was a lease at inception based on whether there is an identified asset, whether the Company has the right to obtain substantially all of the economic benefits from use of the asset and whether the Company has the right to direct the use of the asset. As of December 31, 2019, the Company only has operating leases and does not have any financing leases. Operating lease ROU assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term. Lease expense for minimum lease payments was recognized on a straight-line basis over the lease term. See Note 9 for further disclosures regarding the Company's operating leases.

Recently Issued Accounting Pronouncements

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* ("ASU 2019-12"). ASU 2019-12 is intended to simplify the accounting for income taxes by, among other things, eliminating certain exceptions related to the approach for intraperiod tax allocation, the methodology for calculating income taxes in an interim period and the recognition of deferred tax liabilities for outside basis differences. ASU 2019-12 is effective for fiscal years beginning after December 15, 2020, with early adoption permitted. Upon adoption, the Company must apply certain aspects of this standard retrospectively for all periods presented while other aspects are applied on a modified retrospective basis through a cumulative-effect adjustment to retained earnings as of the beginning of the fiscal year of adoption. The Company is currently evaluating the impact of this new standard on its consolidated financial statements.

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 is intended to provide more decision-useful information about expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. The main provisions include presenting financial assets measured at amortized cost at the amount expected to be collected, which is net of an allowance for expected credit losses, and recording credit losses related to available-for-sale securities through an allowance for credit losses. The amendments in ASU 2016-13 are effective for fiscal years beginning after December 15, 2019, and must be applied using a modified retrospective approach with earlier adoption permitted for fiscal years beginning after December 15, 2018. The Company does not expect the adoption of this amendment to have a material impact on its consolidated financial statements.

4. REVENUE

The Company adopted ASC 606 effective January 1, 2018 using the modified retrospective method. The Company recognized the cumulative effect of initially applying ASC 606, which was immaterial, as an adjustment to the opening balance of retained earnings. The comparative prior period information is accounted for in accordance with the previous revenue guidance, ASC 605, and has not been restated. In accordance with ASC 606, the Company recognizes revenue under the core principle to depict the transfer of control to the Company's customers in an amount reflecting the consideration the Company expects to be entitled. In order to achieve that core principle, the Company applies the following five step approach: (1) identify the contract with a customer, (2) identify the performance obligations in the contract, (3) determine the transaction price, (4) allocate the transaction price to the performance obligations in the contract and (5) recognize revenue when a performance obligation is satisfied.

Revenue for product sales is recognized at the point in time when control transfers to the Company's customers, which is generally when products are shipped from the Company's manufacturing facilities or when delivered to the customer's named location. When the Company performs shipping and handling activities after the transfer of control to the customer (e.g., when control transfers prior to delivery), they are considered to be fulfillment activities, and accordingly, the costs are accrued for when the related revenue is recognized. Taxes collected on behalf of customers relating to product sales and remitted to governmental authorities, principally sales taxes, are excluded from revenue.

The opening and closing balances of the Company's accounts receivable and deferred revenue are as follows (in thousands):

	Balance at Beginning of Period (1/1/19)	Increase / (Decrease)	Balance at End of Period
Year Ended December 31, 2019			
Accounts receivable	\$ 90,831	\$ 7,117	\$ 97,948
Deferred revenue (current)	\$ 5,101	\$ (618)	\$ 4,483
Deferred revenue (non-current)	\$ 3,707	\$ (263)	\$ 3,444

The amount of revenue recognized in the period that was included in the opening deferred revenue balances was approximately \$5.1 million for the year ended December 31, 2019. Generally, increases in current and non-current deferred revenue are related to billings to, or advance payments from, customers for which the Company has not yet fulfilled its performance obligations, and decreases are related to revenue recognized. Deferred revenue not expected to be recognized within the Company's operating cycle of one year is presented as a component of "Other long-term liabilities" on the consolidated balance sheet.

At times, the Company receives orders for products that may be delivered over multiple dates that may extend across reporting periods. The Company invoices for each delivery upon shipment and recognizes revenues for each distinct product delivered, assuming transfer of control has occurred. Generally, scheduled delivery dates are within one year, and the Company has elected to use the optional exemption whereby revenues allocated to partially completed contracts with an expected duration of one year or less are not disclosed. As of December 31, 2019, the Company had no contracts with unsatisfied performance obligations with a duration of more than one year.

Disaggregation of Revenue

The following table provides information about disaggregated revenue based on product group (in thousands). Further disaggregation of revenue by geographic country can be found in Note 3.

	Year Ended December 31, 2019		Year Ended December 31, 2018	
	Revenue (\$)	Revenue (%)	Revenue (\$)	Revenue (%)
Embedded Modules	\$ 86,932	19%	\$ 77,286	23%
Pluggable Modules	217,620	47%	189,533	56%
Semiconductors	160,111	34%	73,072	21%
Total revenue	\$ 464,663	100%	\$ 339,891	100%

5. FINANCIAL INSTRUMENTS

The following tables set forth the Company's cash, cash equivalents and short- and long-term marketable securities as of December 31, 2019 and 2018 (in thousands):

	December 31, 2019					
	Amortized Cost	Gross Unrealized		Estimated Fair Value	Cash and Cash Equivalents	Marketable Securities
		Gains	Losses ⁽¹⁾			
Cash	\$ 29,116	\$ —	\$ —	\$ 29,116	\$ 29,116	\$ —
Money market funds	2,010	—	—	2,010	2,010	—
U.S. treasury bonds	116,710	126	(1)	116,835	—	116,835
Commercial paper	44,300	—	—	44,300	5,491	38,809
Certificates of deposit	24,522	19	(2)	24,539	—	24,539
Asset-backed securities	73,370	134	(5)	73,499	—	73,499
Corporate debt securities	180,607	475	(3)	181,079	—	181,079
Total	\$ 470,635	\$ 754	\$ (11)	\$ 471,378	\$ 36,617	\$ 434,761

(1) Losses represent marketable securities that were in loss positions for less than one year.

December 31, 2018

	Gross Unrealized						
	Amortized Cost	Gains	Losses		Estimated Fair Value	Cash and Cash Equivalents	Marketable Securities
			Less than One Year	Greater than One Year			
Cash	\$ 49,650	\$ —	\$ —	\$ —	\$ 49,650	\$ 49,650	\$ —
Money market funds	1,563	—	—	—	1,563	1,563	—
U.S. treasury bonds	40,367	—	(9)	(3)	40,355	—	40,355
Commercial paper	60,435	—	(13)	—	60,422	6,668	53,754
Certificates of deposit	36,839	13	(12)	—	36,840	—	36,840
Asset-backed securities	47,798	1	(63)	(22)	47,714	—	47,714
Corporate debt securities	163,654	9	(239)	(100)	163,324	2,563	160,761
Total	\$ 400,306	\$ 23	\$ (336)	\$ (125)	\$ 399,868	\$ 60,444	\$ 339,424

The proceeds from the sales and maturities of marketable securities, which were primarily reinvested and resulted in realized gains and losses, were as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Proceeds from the sales and maturities of marketable securities	\$ 384,467	\$ 340,920	\$ 242,735
Realized gains	\$ 67	\$ 18	\$ 16
Realized losses	\$ (2)	\$ (109)	\$ (2)

The contractual maturities of short-term and long-term marketable securities held at December 31, 2019 and 2018 are as follows (in thousands):

	December 31, 2019		December 31, 2018	
	Amortized Cost Basis	Aggregate Fair Value	Amortized Cost Basis	Aggregate Fair Value
Due within one year	\$ 299,725	\$ 300,129	\$ 264,959	\$ 264,660
Due after one year through four years	134,292	134,632	74,902	74,764
Total	\$ 434,017	\$ 434,761	\$ 339,861	\$ 339,424

At December 31, 2019, the Company believed that any unrealized losses on its available-for-sale investments were temporary. The investments with unrealized losses consisted primarily of asset-backed securities. In making the determination that the decline in fair value of these securities was temporary, the Company considered various factors, including, but not limited to: the length of time each security was in an unrealized loss position; the extent to which fair value was less than cost; the financial condition and near-term prospects of the issuers; and the Company's intent not to sell these securities and the assessment that it is more likely than not that the Company would not be required to sell these securities before the recovery of their amortized cost basis.

Unrealized gains and losses, net of taxes, are reported as a component of accumulated other comprehensive income (loss) in the Company's consolidated statements of stockholders' equity. No material amounts were reclassified out of accumulated other comprehensive income (loss) during the years ended December 31, 2019, 2018 and 2017 for realized gains or losses on available-for-sale investments.

6. INVENTORY

Inventory consisted of the following as of December 31, 2019 and 2018 (in thousands):

	December 31,	
	2019	2018
Raw materials	\$ 24,777	\$ 18,420
Work-in-process	673	218
Finished goods	15,370	6,873
Inventory	<u>\$ 40,820</u>	<u>\$ 25,511</u>

7. PROPERTY AND EQUIPMENT

Property and equipment consisted of the following as of December 31, 2019 and 2018 (in thousands):

	December 31,	
	2019	2018
Engineering laboratory equipment	\$ 58,320	\$ 50,590
Computer software	3,730	3,132
Computer equipment	7,837	6,018
Furniture and fixtures	3,641	3,227
Leasehold improvements	3,999	3,581
Construction in progress	2,449	1,279
Total property and equipment	<u>79,976</u>	<u>67,827</u>
Less: Accumulated depreciation	(53,175)	(41,184)
Property and equipment, net	<u>\$ 26,801</u>	<u>\$ 26,643</u>

Depreciation expense was \$12.6 million, \$13.6 million and \$12.3 million for the years ended December 31, 2019, 2018 and 2017, respectively.

8. ACCRUED LIABILITIES

Accrued liabilities consisted of the following as of December 31, 2019 and 2018 (in thousands):

	December 31,	
	2019	2018
Employee-related liabilities	\$ 10,816	\$ 8,509
Current maturities of operating leases	4,228	—
Goods and services received not invoiced	2,297	3,592
Accrued manufacturing related expenses	3,781	2,342
Warranty reserve	10,354	8,220
Litigation and settlement accrual	20,000	2,500
Other accrued liabilities	10,204	6,685
Accrued liabilities	<u>\$ 61,680</u>	<u>\$ 31,848</u>

Certain prior period amounts have been reclassified to conform to the current period presentation. Specifically, as of December 31, 2018, \$2.5 million of litigation and settlement accruals were included within "Other accrued liabilities" and have now been reclassified to be presented on a separate line in conformity with the current period presentation.

9. LEASES

The Company adopted ASC 842 effective January 1, 2019 using the modified retrospective approach and the effective date as the date of initial application. In addition, the Company elected the package of practical expedients permitted under the transition guidance within the new standard, which allows the carry forward of the Company's historical assessments of (1) whether contracts are or contain leases, (2) lease classification and (3) initial direct costs. As permitted by ASC 842, the Company has also elected not to apply the recognition requirements to short-term leases (with terms less than 12 months) and not to separate non-lease components from associated lease components for its real estate lease assets. The comparative prior period information has not been restated and continues to be reported under the accounting standards in effect for those periods.

The Company leases real estate assets and equipment. For leases with terms greater than 12 months, the Company records the related ROU asset and lease obligation at the present value of lease payments over the term. Many leases include fixed rental escalation clauses, renewal options and/or termination options that are factored into the determination of lease payments when appropriate. The Company's leases do not usually provide a readily determinable implicit discount rate; therefore, an estimate of the Company's incremental borrowing rate is used to discount the lease payments based on information available at lease commencement, including observable rates, adjusted for various factors including financing spreads and other lease specific adjustments, as applicable.

The Company's leases have remaining lease terms of less than one year to eight years. Some leases include one or more options to renew with renewal terms that can extend the lease term from two years to ten years, or options to terminate the leases, both at the Company's discretion. The Company's lease terms do not include options to extend or terminate leases because the Company was not reasonably certain that it would exercise those options. Lease expense for minimum lease payments is recognized on a straight-line basis over the lease term. The Company's lease agreements do not contain any variable lease payments, material residual value guarantees or material restrictive covenants.

The table below presents the lease-related assets and liabilities recorded on the consolidated balance sheet as of December 31, 2019 (in thousands):

	Classification on the Balance Sheet	December 31, 2019
Assets		
Operating lease assets	Operating lease right-of-use assets	\$ 25,046
Liabilities		
Current - operating	Accrued liabilities	4,228
Noncurrent - operating	Noncurrent operating lease liabilities	15,726
Total lease liabilities		<u>\$ 19,954</u>
Weighted-average remaining lease term - operating leases		5.2 years
Weighted-average discount rate - operating leases(1)		4.79%

(1) Upon adoption of ASC 842, discount rates used for existing leases were established at January 1, 2019, which was the date of the Company's initial adoption of ASC 842.

Operating lease costs were \$5.6 million during the year ended December 31, 2019. Short-term lease costs during the year ended December 31, 2019 were immaterial. Cash paid for amounts included in the measurement of lease liabilities was \$5.3 million during the year ended December 31, 2019, which were operating cash outflows.

The table below reconciles the undiscounted cash flows for each of the first five years and total of the remaining years to the operating lease liabilities recorded on the consolidated balance sheet as of December 31, 2019 (in thousands):

	Operating Leases
2020	\$ 4,336
2021	4,389
2022	4,261
2023	4,414
2024	3,270
Thereafter	2,033
Total minimum lease payments	<u>22,703</u>
Less: amount of lease payments representing interest	(2,749)
Present value of future minimum lease payments	<u>19,954</u>
Less: current obligation under leases	4,228
Long-term lease obligations	<u>\$ 15,726</u>

Disclosures related to periods prior to adoption of ASC 842

Rent expense for the years ended December 31, 2018 and 2017 were \$4.7 million and \$5.2 million, respectively, recognized on a straight-line basis for the Company's facility leases which were accounted for as operating leases. Future minimum lease payments due under those non-cancelable lease agreements as of December 31, 2018 were as follows (in thousands):

	Amounts	
2019	\$	3,888
2020		4,280
2021		4,394
2022		4,248
2023		4,401
Thereafter		5,252
Total	\$	26,463

10. FAIR VALUE MEASUREMENT

The Company measures certain financial assets and liabilities at fair value. Fair value is determined based upon the exit price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants, as determined by either the principal market or the most advantageous market. Inputs used in the valuation techniques to derive fair values are classified based on a three-level hierarchy, as follows:

Level 1—Quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2—Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities, quoted prices in markets with insufficient volume or infrequent transactions (less active markets), or model-derived valuations in which all significant inputs are observable or can be derived principally from or corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3—Unobservable inputs to the valuation methodology that are significant to the measurement of fair value of assets or liabilities.

The Company considers all highly liquid investments purchased with an original maturity of three months or less to be cash equivalents. The Company's investments are in money market funds, U.S. treasury bonds, commercial paper, certificates of deposit, asset-backed securities and corporate debt securities, which are classified as Level 2 within the fair value hierarchy, and were initially valued at the transaction price and subsequently valued at each reporting date utilizing market-observable data. The market-observable data included reportable trades, benchmark yields, credit spreads, broker/dealer quotes, bids, offers, current spot rates and other industry and economic events.

The fair value of these assets measured on a recurring basis was determined using the following inputs as of December 31, 2019 and 2018 (in thousands):

	December 31, 2019			
	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total Fair Value
Assets:				
Money market funds	\$ —	\$ 2,010	\$ —	\$ 2,010
U.S. treasury bonds	—	116,835	—	116,835
Commercial paper	—	44,300	—	44,300
Certificates of deposit	—	24,539	—	24,539
Asset-backed securities	—	73,499	—	73,499
Corporate debt securities	—	181,079	—	181,079
Total	\$ —	\$ 442,262	\$ —	\$ 442,262

	December 31, 2018			
	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total Fair Value
Assets:				
Money market funds	\$ —	\$ 1,563	\$ —	\$ 1,563
U.S. treasury bonds	—	40,355	—	40,355
Commercial paper	—	60,422	—	60,422
Certificates of deposit	—	36,840	—	36,840
Asset-backed securities	—	47,714	—	47,714
Corporate debt securities	—	163,324	—	163,324
Total	\$ —	\$ 350,218	\$ —	\$ 350,218

There were no transfers between fair value measurement levels during the years ended December 31, 2019 and 2018. For certain other financial instruments, including accounts receivable, accounts payable and other current liabilities, the carrying amounts approximate their fair value due to the relatively short maturity of these balances.

11. STOCK COMPENSATION PLANS

The following table summarizes the classification of stock-based compensation in the consolidated income statements for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Cost of revenue	\$ 2,047	\$ 2,075	\$ 1,993
Research and development	21,383	17,564	14,150
Sales, general and administrative	11,723	9,975	7,230
Total stock-based compensation	\$ 35,153	\$ 29,614	\$ 23,373

The following table summarizes stock-based compensation expense by award type for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Restricted stock units	\$ 31,811	\$ 25,864	\$ 19,455
Stock options	1,902	2,343	2,614
Employee stock purchase plan	1,119	1,284	1,188
Other awards	321	123	116
Total stock-based compensation	\$ 35,153	\$ 29,614	\$ 23,373

2009 Stock Plan

In November 2009, the Company adopted the 2009 Stock Plan, as amended in October 2015 and March 2016 (the “2009 Plan”). The 2009 Plan provided for the grant of incentive stock options, nonstatutory stock options, RSUs and the right to purchase restricted common stock to employees, officers, directors and advisors of the Company. Recipients of incentive stock options and nonstatutory stock options are eligible to purchase shares of the Company’s common stock at an exercise price equal to the estimated fair value of such stock on the grant date. Stock options and RSUs granted under the 2009 Plan generally vest as follows (1) 20% on the first anniversary of the original vesting date, with the balance vesting monthly over the remaining four years or (2) 25% on the first anniversary of the original vesting date, with the balance vesting monthly or quarterly over the remaining three years, unless they contain specific performance and/or market-based vesting provisions. The maximum term of stock options and RSUs granted under the 2009 Plan is ten and seven years, respectively.

The 2016 Equity Incentive Plan (the “2016 Plan”) became effective on May 12, 2016, at which time the Company ceased granting equity awards under the 2009 Plan. The then outstanding equity awards granted under the 2009 Plan remain outstanding, subject to the terms of the 2009 Plan and applicable award agreements, until such shares are issued under those awards, by exercise of stock options or settlement of restricted awards, or until the awards terminate or expire by their terms. When the 2016 Plan became effective, there were 497,302 remaining shares available for grant under the 2009 Plan which were added to the reserves of the 2016 Plan.

2016 Equity Incentive Plan

The 2016 Plan provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, RSUs and other stock-based awards. Recipients of incentive stock options and nonstatutory stock options are eligible to purchase shares of the Company’s common stock at an exercise price equal to the fair value of such stock on the grant date. Stock options and RSUs granted under the 2016 Plan generally vest 25% on the first anniversary of the original vesting date, with the balance vesting quarterly or annually over the remaining three years, unless they contain specific performance and/or market-based vesting provisions. The maximum term of stock options granted under the 2016 Plan is ten years.

The 2016 Plan will terminate ten years from the effective date, unless it is terminated earlier by the Company’s board of directors. As of December 31, 2019, there were 4,291,670 shares available for future issuance. The number of shares reserved for issuance under the 2016 Plan will increase automatically on the first day of each January through 2025 equal to the least of (i) 3,600,000 shares of Common Stock, (ii) 4.0% of the outstanding shares on such date and (iii) an amount determined by the board of directors. In December 2019, the board of directors approved an increase in the number of shares available for issuance under the 2016 Plan in accordance with the automatic annual increase provisions of the 2016 Plan. Inclusive of this approved increase, a maximum of 9,535,633 shares of the Company’s common stock are authorized or available for issuance under the 2016 Plan.

Stock Options

The estimated grant-date fair value of the Company’s stock option awards issued to employees was calculated using the Black-Scholes option-pricing model. No stock options were granted in the years ended December 31, 2019 and 2017. During the year ended December 31, 2018, the assumptions used in the Black-Scholes model were as follows:

	Year Ended December 31, 2018
Risk-free interest rate	2.9%
Expected dividend yield	None
Expected volatility	53.5%
Expected term (in years)	6.3

Risk-free Interest Rate. The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant for zero coupon U.S. Treasury notes with maturities approximately equal to the option’s expected term.

Expected Dividend Yield. The expected dividend yield assumption is based on the fact that the Company has never paid cash dividends and has no present intention to pay cash dividends.

Expected Volatility. For options awarded during 2018, the expected volatility was derived from a blend of average historical stock volatilities of several unrelated public companies within the Company’s industry and the Company’s historical volatility, both over a period equivalent to the expected term of the stock option grants.

Expected Term. The expected term represents the period that stock options awards are expected to be outstanding. For option grants that are considered to be “plain vanilla,” the Company determines the expected term using the simplified method. The simplified method deems the term to be the average of the time-to-vesting and the contractual life of the options. The Company uses the simplified method because it does not have sufficient historical option exercise data to provide a reasonable basis upon which to estimate the expected term.

The Company uses the market closing price of its common stock as reported on the Nasdaq Global Select Market to determine the fair value of the shares of common stock underlying stock options.

A summary of stock option activity under the Company's equity incentive plans for the year ended December 31, 2019 is as follows:

	Number of Options (in thousands)	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2018	1,116	\$ 9.78	5.7	\$ 33,113
Granted	—	\$ —		
Exercised	(382)	\$ 6.95		\$ 18,548
Canceled	(19)	\$ 15.85		
Outstanding at December 31, 2019	715	\$ 11.14	4.6	\$ 41,036
Vested and expected to vest at:				
December 31, 2019	715	\$ 11.14	4.6	\$ 41,036
Exercisable at:				
December 31, 2019	671	\$ 9.99	4.4	\$ 39,212

As of December 31, 2019 and 2018, there was \$0.5 million and \$2.5 million of unrecognized compensation cost related to unvested common stock options, which is expected to be recognized over weighted-average periods of 0.6 years and 1.1 years, respectively.

The weighted-average grant date fair value of stock options granted during the year ended December 31, 2018 was \$15.58. No stock options were granted by the Company during the years ended December 31, 2019 and 2017. The intrinsic value of stock options exercised during the years ended December 31, 2019, 2018 and 2017 was \$18.5 million, \$15.9 million and \$33.5 million, respectively.

Restricted Stock Units

During the year ended December 31, 2017, the Company granted 461,000 RSUs to executive officers that included a market condition and a performance condition in addition to a service condition ("2017 PRSUs"). Each 2017 PRSU represented the right to receive one share of the Company's common stock when and if the applicable vesting conditions were satisfied. The number of 2017 PRSUs that were subject to the service condition was determined based on the achievement of certain market and performance objectives over a two-year period running from January 1, 2017 through December 31, 2018 (the "Earned 2017 PRSUs"), determined based on the extent to which the Company achieved (i) a revenue growth objective, based on the compound annual growth rate of the Company's total revenue by measuring the Company's revenue for fiscal year 2018 against the Company's revenue for fiscal year 2016 (the "Revenue Growth Objective"), and/or (ii) a stock price objective during the two-year period (the "Stock Price Objective"). As neither the Revenue Growth Objective nor the Stock Price Objective were achieved during the two year performance period, the 2017 PRSUs were forfeited during the year ended December 31, 2019. The related expense will continue to be amortized over the original vesting period which ends on March 17, 2021.

For the 2017 PRSUs, the related stock-based compensation expense is amortized using the accelerated method over the vesting period of four years. The Company estimated the fair value of the 2017 PRSUs using a Monte Carlo valuation model on the date of grant, using the following assumptions:

Risk-free interest rate	1.3%
Expected dividend yield	None
Expected volatility	58.3%
Expected term (in years)	1.8
Grant date fair value of underlying shares	\$40.38 - \$55.02

During the year ended December 31, 2018, the Company granted awards covering up to a maximum of 94,854 performance-based RSUs to executive officers that include a market condition in addition to a service condition (“2018 PRSUs”). Each 2018 PRSU represents the right to receive one share of the Company’s common stock when and if the applicable vesting conditions are satisfied. The 2018 PRSUs are subject to performance-based vesting. The number of 2018 PRSUs that vest is measured based on the level of achievement of a performance objective over a three-year period (the “2018 Performance Period”) running from January 1, 2018 through December 31, 2020, as determined and certified by the compensation committee of the Company’s board of directors following the end of the 2018 Performance Period. The level of achievement will be determined based on the Company’s percentile achievement of relative total shareholder returns against an external comparator group during the 2018 Performance Period (the “2018 Relative TSR Objective”). Vesting of the 2018 PRSUs is also subject to the applicable officer’s continued provision of services to the Company through the vesting date, except in the case of death or disability where vesting will be pro-rated for time worked during the 2018 Performance Period. No 2018 PRSUs will vest unless a threshold level of achievement of the 2018 Relative TSR Objective is achieved.

For the 2018 PRSUs, the related stock-based compensation expense is amortized using the accelerated method over the vesting period of approximately three years. The Company estimated the fair value of the 2018 PRSUs using a Monte Carlo valuation model on the date of grant, using the following assumptions:

Risk-free interest rate	2.3%
Expected dividend yield	None
Expected volatility	51.4%
Expected term (in years)	2.9
Grant date fair value of underlying shares	\$34.59 - \$39.02

During the year ended December 31, 2019, the Company granted awards covering up to a maximum of 187,234 performance-based RSUs to executive officers that include a market condition in addition to a service condition (“2019 PRSUs”). Each 2019 PRSU represents the right to receive one share of the Company’s common stock when and if the applicable vesting conditions are satisfied. The 2019 PRSUs are subject to performance-based vesting. The number of 2019 PRSUs that vest is measured based on the level of achievement of a performance objective over a three-year period (the “2019 Performance Period”) running from January 1, 2019 through December 31, 2021, as determined and certified by the compensation committee of the Company’s board of directors following the end of the 2019 Performance Period. The level of achievement will be determined based on the Company’s percentile achievement of relative total shareholder returns against an external comparator group during the 2019 Performance Period (the “2019 Relative TSR Objective”). Vesting of the 2019 PRSUs is also subject to the applicable officer’s continued provision of services to the Company through the vesting date, except in the case of death or disability where vesting will be pro-rated for time worked during the 2019 Performance Period. No 2019 PRSUs will vest unless a threshold level of achievement of the 2019 Relative TSR Objective is achieved.

For the 2019 PRSUs, the related stock-based compensation expense is amortized using the accelerated method over the vesting period of approximately three years. The Company estimated the fair value of the 2019 PRSUs using a Monte Carlo valuation model on the date of grant, using the following assumptions:

Risk-free interest rate	2.5%
Expected dividend yield	None
Expected volatility	57.3%
Expected term (in years)	2.9
Grant date fair value of underlying shares	\$44.43

With the exception of one non-executive RSU grant that vests upon the satisfaction of both a performance condition and a service condition, all other RSUs granted to employees, executives and directors vest upon the satisfaction of a service condition, generally over a period of four years. The cost of RSUs with only a service condition is determined using the fair value of the Company’s common stock on the date of grant, and compensation expense is generally recognized on a ratable basis over the requisite vesting period.

As soon as practicable following each vesting date, the Company will issue to the holder of the RSUs, including PRSUs, the number of shares of common stock equal to the aggregate number of RSUs that have vested. Notwithstanding the foregoing, the Company may, in its sole discretion, in lieu of issuing shares of common stock to the holder of the RSUs, pay the holder an amount in cash equal to the fair market value of such shares of common stock. To date, the Company has not settled any vested RSUs with cash.

A summary of the changes in the Company's RSUs during the year ended December 31, 2019 is as follows:

	Restricted Shares (in thousands)	Weighted-Average Grant Date Fair Value
Outstanding at December 31, 2018	2,325	\$ 40.55
Granted	1,007	\$ 55.53
Vested	(890)	\$ 30.95
Canceled	(491)	\$ 56.33
Outstanding at December 31, 2019	1,951	\$ 48.69

At December 31, 2019 and 2018, there was \$70.1 million and \$52.5 million of total unrecognized compensation cost related to unvested RSUs, which will be recognized over weighted-average periods of 2.1 years and 1.9 years, respectively.

Amended and Restated 2016 Employee Stock Purchase Plan

The Company's board of directors adopted the Amended and Restated 2016 Employee Stock Purchase Plan ("2016 ESPP"), which became effective on May 18, 2016. The 2016 ESPP allows eligible employees to purchase shares of the Company's common stock at a discount through payroll deductions of up to 15% of eligible compensation, subject to any plan limitations. The 2016 ESPP provides for 6-month offering periods beginning in May and November of each year.

On each purchase date, eligible employees purchase common stock at a price per share equal to 85% of the lesser of the fair market value of the Company's common stock on (1) the first trading day of the applicable offering period and (2) the last trading day of the applicable offering period.

The fair value of the awards issued under the 2016 ESPP to employees was estimated at the beginning of the offering period using a Black-Scholes option-pricing model with the following assumptions:

	Year Ended December 31,		
	2019	2018	2017
Risk-free interest rate	2.4% - 2.5%	1.3% - 2.1%	0.5% - 1.0%
Expected dividend yield	None	None	None
Expected volatility	38.9% - 45.5%	48.6% - 66.4%	48.7% - 58.7%
Expected term (in years)	0.5	0.5	0.5

In accordance with the Merger Agreement, the 2016 ESPP was suspended on November 14, 2019, the last day of the first offering period following the Merger Agreement effective date. Conditioned on the consummation of the proposed Merger, no new offering periods are expected to commence on or after the suspension date.

Preferred Stock

The Company has authorized the issuance of preferred stock with rights and preferences, including voting rights, designated from time to time by the board of directors. As of December 31, 2019, there were 5,000,000 shares of preferred stock authorized with a par value of \$0.0001 per share, and no shares of preferred stock issued or outstanding.

12. NET INCOME PER SHARE

The following table sets forth the computation of the Company's basic and diluted net income per share (in thousands, except per share amounts):

	Year Ended December 31,		
	2019	2018	2017
Numerator:			
Net income	\$ 32,839	\$ 4,916	\$ 38,508
Denominator:			
Weighted-average shares used to compute net income per share - basic	40,883	40,259	38,920
Dilutive effect of stock options, unvested restricted stock and restricted stock units, and employee stock purchase plan	1,671	1,738	2,770
Weighted-average shares used to compute net income per share - diluted	42,554	41,997	41,690
Net income per share			
Basic	\$ 0.80	\$ 0.12	\$ 0.99
Diluted	\$ 0.77	\$ 0.12	\$ 0.92

The following common stock equivalents (in thousands) were excluded from the computation of diluted net income per share for the periods presented because including them would have been antidilutive:

	Year Ended December 31,		
	2019	2018	2017
Options to purchase common stock	37	91	87
Unvested restricted stock units	86	336	425
Employee stock purchase plan	—	1	—

As discussed further in Note 11, the Company has granted PRSUs to executives that include a market condition and a service condition. Estimates of the number of shares contingently issuable based on average market prices through December 31, 2019 for these awards have been included in the antidilutive table above.

13. COMMITMENTS AND CONTINGENCIES

Warranties

The Company's standard warranty obligation to its customers provides for repair or replacement of a defective product at the Company's discretion for a period of time following purchase, generally between 12 and 24 months. Factors that affect the warranty obligation include product failure rates, material usage and service delivery costs incurred in correcting product failures. In addition, from time to time, specific warranty accruals may be made if unforeseen technical problems arise. The estimated cost associated with fulfilling the Company's warranty obligation to customers is recorded in cost of revenue.

Changes in the Company's warranty liability, which is included as a component of accrued liabilities on the consolidated balance sheets, are set forth in the table below (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Warranty reserve, beginning of period	\$ 8,220	\$ 8,306	\$ 2,158
Provisions made to warranty reserve during the period	13,708	11,775	16,597
Charges against warranty reserve during the period	(11,574)	(11,861)	(10,449)
Warranty reserve, end of period	\$ 10,354	\$ 8,220	\$ 8,306

Legal Contingencies

On January 21, 2016, ViaSat, Inc. filed a lawsuit in California state court, 37-2016-00002323-CU-BC-NC, later removed to the U.S. District Court for the Southern District of California, against the Company alleging, among other things, breach of contract, breach of the implied covenant of good faith and fair dealing and misappropriation of trade secrets. On February 19, 2016, the Company responded to ViaSat's lawsuit and alleged counterclaims against ViaSat including, among other things, patent misappropriation, breach of contract, breach of the implied covenant of good faith and fair dealing, misappropriation of trade secrets and unfair competition. In its response filed March 16, 2016, ViaSat denied the Company's counterclaims. On

September 28, 2018 the matter was remanded back to the California Superior Court, County of San Diego, North County Division 3:16-cv-00463, D.I. 197.

In April 2019, the California Superior Court denied the parties' cross motions for summary adjudication. At the court's direction, the parties participated in a mandatory mediation process, but no resolution was reached. Trial took place in June and July of 2019, and the jury returned a verdict on July 17, 2019. The jury found against the Company for breach of contract, willful and malicious misappropriation of trade secrets, and breach of the covenant of good faith and fair dealing implied by law in the parties' contract. The jury also found that ViaSat breached the same contract and misappropriated the Company's trade secrets. The jury awarded damages of \$49.3 million to ViaSat for the Company's breaches of contract, and \$1 to ViaSat for its trade secret misappropriation claim. The jury awarded \$1 to the Company for ViaSat's misappropriation of trade secrets and awarded no damages to the Company for ViaSat's breach of contract. ViaSat filed post-trial motions seeking up to approximately \$10.0 million for attorney's fees and approximately \$6.2 million for so-called "cost-of-proof" sanctions and an order that the Company pay ongoing royalties on sales after December 30, 2018. ViaSat also sought a new trial and judgment in its favor notwithstanding the verdict on its trade secret damages claim. The Company filed post-trial motions for entry of judgment in its favor notwithstanding the verdict on ViaSat's breach of contract and trade secret damages claims and for a new trial, and moved to reduce the total damages awarded to ViaSat to no more than \$12.8 million pursuant to a provision of the contract containing a limitation on liability for claims arising from the contract. The Court denied the post-trial motions filed by both parties, and on December 5, 2019, the Court entered judgment (the "December 2019 Judgment") against the Company in the amount of \$49.3 million, and against ViaSat in the amount of \$1. On January 17, 2020, the Court awarded ViaSat an additional \$0.1 million in costs. On December 20, 2019, the Company filed a notice of appeal of the December 2019 Judgment, and ViaSat filed a notice of cross-appeal on December 26, 2019. As of December 31, 2019, the Company has accrued a total of \$20.0 million in litigation and settlement-related accruals. The amount of such accruals is based upon currently available information and is subject to significant judgment and a variety of assumptions and known and unknown uncertainties, which may change quickly and significantly from time to time. As a result, actual losses could significantly exceed the amount of such accruals, and no conclusion as to the Company's ultimate exposure from these proceedings should be drawn from such accruals. In view of the numerous legal, technical and factual issues involved in this lawsuit, the Company is not able to provide an estimate of the likely outcome or range of outcomes, if any, at this time.

On November 6, 2019, ViaSat, Inc. filed a second lawsuit in California Superior Court, County of San Diego, North County Division, 37-2019-00060731, D.I. 01, against the Company alleging breach of contract, breach of the implied covenant of good faith and fair dealing, and misappropriation of trade secrets. ViaSat's complaint relies on the verdict in the first lawsuit, seeks damages on sales of the Company's products after December 31, 2018, and its claims for relief include preliminary and permanent injunctive relief prohibiting sales of the Company's products alleged by ViaSat to misappropriate its trade secrets. On January 17, 2020, the Company responded to ViaSat's second lawsuit with a general denial and moved to stay the case pending the resolution of the appeal in the first lawsuit. The hearing on the Company's motion to stay is scheduled for February 28, 2020. In view of the numerous legal, technical and factual issues involved in this lawsuit, the Company is not able to provide an estimate of the likely outcome or range of outcomes, if any, at this time.

On July 28, 2017, the Company filed a lawsuit in the Commonwealth of Massachusetts Superior Court - Business Litigation Session against ViaSat asserting commercial disparagement, libel, slander of title, unfair competition, intentional interference with advantageous relations and intentional interference with contractual relations. On April 5, 2018, ViaSat responded to the Company's action and alleged counterclaims including, among other things, breach of contract, breach of the implied covenant of good faith and fair dealing, misappropriation of trade secrets, and unfair competition. On December 13, 2018, the Massachusetts court entered an order staying the Massachusetts litigation pending resolution of the first California state court action discussed above. On December 12, 2019, the Massachusetts court entered an order continuing the stay of the Massachusetts litigation to and including July 10, 2020.

The litigation matters described above, are referred to collectively as the ViaSat litigation.

On August 5, 2019, a lawsuit, captioned Jiang v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-07267 (the "Jiang Action"), was filed against the Company and each of the Company's directors in the United States District Court for the Southern District of New York alleging violations of Sections 14(a) and 20(a) of the Securities Exchange Act of 1934 (the "Exchange Act") and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a materially incomplete and misleading preliminary proxy statement in connection with the proposed merger of Acacia with the Parent and Merger Sub. On August 5, 2019, a putative class action lawsuit, captioned O'Brien v. Acacia Communications, Inc., et al., Civil Action No. 1:19-cv-01463 (the "O'Brien Action"), was filed against the Company and each of the Company's directors in the United States District Court for the District of Delaware alleging that the Company's directors breached their fiduciary duties by, among other things, agreeing to the proposed Merger without taking steps to obtain adequate, fair and maximum consideration under the circumstances and engineering the proposed Merger to improperly benefit themselves, the Company's

management and/or the Parent without regard for the Company's public stockholders, and that Acacia and its directors violated Sections 14(a) and 20(a) of the Exchange Act by disseminating a materially incomplete and misleading preliminary proxy statement in connection with the proposed Merger. On August 6, 2019, a putative class action lawsuit, captioned *Rosenblatt v. Acacia Communications, Inc., et al.*, Civil Action No. 1:19-cv-01470 (the "Rosenblatt Action"), was filed against the Company and each of the Company's directors in the United States District Court for the District of Delaware alleging violations of Sections 14(a) and 20(a) of the Exchange Act and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a false and misleading preliminary proxy statement in connection with the proposed Merger. On August 7, 2019, a lawsuit, captioned *Mac v. Acacia Communications, Inc., et al.*, Civil Action No. 1:19-cv-11706 (the "Mac Action"), was filed against the Company and each of the Company's directors in the United States District Court for the District of Massachusetts alleging violations of Sections 14(a) and 20(a) of the Exchange Act and Rule 14a-9 promulgated thereunder against the defendants for allegedly disseminating a materially deficient and misleading preliminary proxy statement in connection with the proposed Merger. The plaintiffs in these lawsuits seek various forms of injunctive and declaratory relief, as well as awards of damages, costs, expert fees and attorneys' fees.

On August 27, 2019, Acacia and the plaintiffs in the O'Brien Action, the Rosenblatt Action and the Mac Action entered into a memorandum of understanding in which these plaintiffs agreed to dismiss with prejudice their individual claims and to dismiss without prejudice the class claims asserted in those actions, in return for the Company's agreement to make the supplemental disclosures set forth under the heading "Supplement to Proxy Statement" in the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on August 27, 2019 (the "Supplemental Disclosures"). On August 27, 2019, Acacia and the plaintiff in the Jiang Action agreed in principle that the plaintiff would dismiss with prejudice his claims asserted in that action, in return for the Company's agreement to make the Supplemental Disclosures; that agreement was memorialized in a memorandum of understanding between Acacia and the plaintiff in the Jiang Action entered into on August 28, 2019. Pursuant to the memoranda of understanding, the plaintiffs in all four actions filed notices of voluntary dismissal on September 11, 2019. Pursuant to the memoranda of understanding, the plaintiffs in these four actions and their counsel reserved their right to file applications seeking attorney's fees and expenses based upon the purported benefit they believe was conferred upon Acacia stockholders by causing the Supplemental Disclosures to be disseminated, and the Company reserved the Company's right to oppose such fee applications. The parties have resolved the fee claim and no fee applications will be necessary.

We intend to continue to engage in a vigorous defense and pursuit of Acacia-favorable judgments of the ongoing litigation matters described above. The ultimate resolution of these proceedings may have a material adverse effect on the Company's results of operations and cash flows, potentially in the near term. In addition, the timing of the final resolution of these proceedings is uncertain. The Company will continue to incur litigation and other expenses as a result of these proceedings, which could have a material impact on the Company's business, consolidated financial position, results of operations and cash flows.

In addition, from time to time the Company may become involved in legal proceedings or be subject to claims arising in the ordinary course of the Company's business. Although the results of litigation and claims cannot be predicted with certainty, the Company currently believes that the final outcome of these ordinary course matters will not have a material adverse effect on the Company's business or on the Company's consolidated financial position, results of operations or cash flows. Regardless of the outcome, litigation can have an adverse impact on the Company because of defense and settlement costs, diversion of management resources and other factors.

Surety Bond

On December 20, 2019, the Company filed a Notice of Appeal to appeal the final judgment issued by the California Superior Court in the ViaSat litigation. In order to stay the execution of the final judgment pending its appeal, the Company filed a surety bond in the amount of \$75.0 million as provided by California Code of Civil Procedure Sec. 917.1. The bond is issued by the Philadelphia Indemnity Insurance Company ("Philadelphia Indemnity"). In support of the bond, the Company entered into an indemnity agreement with Philadelphia Indemnity to indemnify it from any liability or loss under the bond. The indemnity agreement does not require collateral to be posted at the time of the issuance of the bond. However, Philadelphia Indemnity may on demand require deposit of an amount sufficient to fund any liability or loss. For additional information, see the discussion regarding the ViaSat litigation under "Legal Contingencies" above.

Indemnification

In the ordinary course of business, the Company enters into various agreements containing standard indemnification provisions. The Company's indemnification obligations under such provisions are typically in effect from the date of execution of the applicable agreement through the end of the applicable statute of limitations. During the years ended December 31, 2019,

2018 and 2017, the Company did not experience any losses related to these indemnification obligations. The Company does not expect significant claims related to these indemnification obligations, and consequently, has concluded that the fair value of these obligations is not material. Accordingly, as of December 31, 2019 and 2018, no amounts have been accrued related to such indemnification provisions.

Potential Payments upon Termination or Change in Control

The Company's Severance and Change in Control Benefits Plan (as amended and restated, the "Severance Plan") provides severance benefits to the Company's executive officers, including certain of the Company's named executive officers, if the executive officer's employment is terminated by the Company without "cause" (as defined in the Severance Plan) or if they terminate their employment with the Company for "good reason" (as defined in the Severance Plan), and additional severance benefits if such terminations occur within one year of a "change in control" (as defined in the Severance Plan) of the Company. For purposes of the Severance Plan, the proposed Merger will constitute a change in control of the Company.

Under the Severance Plan, if the Company terminates an eligible executive officer's employment without cause prior to or more than 12 months following the closing of a change in control of the Company (an "Involuntary Termination"), the executive officer is entitled to:

- continue receiving his or her base salary for a specified period following the date of termination (in the case of the Company's chief executive officer, for 12 months, and, in the case of all other participants, for nine months);
- Company contributions to the cost of health care continuation under the Consolidated Omnibus Budget Reconciliation Act ("COBRA"), for U.S. based eligible executive officers, or substantially equivalent medical benefits for non-U.S. based eligible executive officers, for up to 12 months following the date of termination of employment (or, to the extent a non-U.S. based eligible executive officer is then receiving a stipend from the Company in lieu of benefits coverage, continued payment of such stipend for up to 12 months following the date of termination of employment); and
- the amount of any unpaid annual bonus determined by the Company's board of directors to be payable to the executive officer for any completed bonus period which ended prior to the date of such executive officer's termination. In addition, under the terms of the Severance Plan, in the case of an Involuntary Termination, all the executive officer's outstanding equity awards that vest solely based on the passage of time will be accelerated and become vested to the extent the award would have vested if the executive had remained employed through a specified period following the date of termination (in the case of the Company's chief executive officer, for 12 months, and, in the case of all other participants, for nine months). The vesting of outstanding performance-based equity awards in connection with an Involuntary Termination is determined by the terms of the applicable award agreements.

The Severance Plan also provides that, if, within 12 months following a change in control of the Company, the Company terminates an eligible executive officer's employment without cause or such executive officer terminates his or her employment with the Company for good reason (a "Change in Control Termination"), the executive officer is entitled to the following benefits; provided, that each of Messrs. Shanmugaraj, Mikkelsen, Givehchi and Rasmussen have entered into employment agreements with Parent or its affiliates that become effective upon the Closing of the proposed Merger and supersede the Severance Plan such that each of Messrs. Shanmugaraj, Mikkelsen, Givehchi and Rasmussen will not be entitled to the following benefits upon a qualifying termination of employment following the proposed Merger and will instead be entitled to the benefits described further below in the Parent employment agreements described in the Company's definitive proxy statement filed with the Securities and Exchange Commission on August 7, 2019, as subsequently amended and supplemented:

- a single lump-sum payment in an amount equal to a 100% of his or her annual base salary;
- a single lump sum payment in an amount equal to 100% of his or her target annual bonus for the year in which the termination of employment occurs;
- Company contributions to the cost of health care continuation under COBRA, for U.S. based eligible executive officers, or substantially equivalent medical benefits for non-U.S. based eligible executive officers, for up to 12 months following the date of termination of employment (or, to the extent a non-U.S. based eligible executive officer is then receiving a stipend from the Company in lieu of benefits coverage, continued payment of such stipend for up to 12 months following the date of termination of employment); and

- the amount of any unpaid annual bonus determined by the Company's board of directors to be payable to the executive officer for any completed bonus period which ended prior to the date of such executive officer's termination. In addition, under the terms of the Severance Plan, in the case of a Change in Control Termination, all of the executive officer's outstanding unvested time-based equity awards will immediately vest in full on the date of such termination. The vesting of outstanding performance-based equity awards in connection with a Change in Control Termination is determined in accordance with the terms of the applicable award agreements.

Each executive officer is also entitled to certain severance benefits upon a termination due to death or disability (as described in the Severance Plan), which severance benefits are not enhanced in connection with a change in control of the Company.

In addition to benefits provided under the Severance Plan, under the terms of award agreements between the Company and certain of the executive officers for equity awards issued to such executive officers prior to the Company's initial public offering, upon the occurrence of a change in control of the Company, such executive officer will get credit for an additional six months of service.

All payments and benefits provided under the Severance Plan are contingent upon the execution and effectiveness of a release of claims by the executive officer in the Company's favor and continued compliance by the executive officer with any proprietary information and inventions, nondisclosure, non-competition, non-solicitation (or similar) agreement to which the Company and the executive officer are party.

14. INCOME TAXES

Income Tax (Benefit) Provision

The components of income (loss) before (benefit) provision for income taxes are as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
United States	\$ (62,991)	\$ (35,832)	\$ (30,030)
Foreign	84,632	35,428	70,333
Total	\$ 21,641	\$ (404)	\$ 40,303

The components of the (benefit) provision for income taxes are as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Current income tax provision (benefit)			
Federal	\$ 135	\$ (9,417)	\$ 18,174
State	252	23	52
Foreign	1,667	921	1,849
Total current income tax provision (benefit)	\$ 2,054	\$ (8,473)	\$ 20,075
Deferred income tax (benefit) provision			
Federal	(7,114)	2,944	(14,108)
State	(5,427)	480	(4,083)
Foreign	(711)	(271)	(89)
Total deferred income tax (benefit) provision	(13,252)	3,153	(18,280)
Total income tax (benefit) provision	\$ (11,198)	\$ (5,320)	\$ 1,795

On December 22, 2017, the Tax Act was signed into law making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a corporate tax rate decrease from 35% to 21% effective for tax years beginning after December 31, 2017, the transition of U.S. international taxation from a worldwide tax system to a territorial system, and a one-time transition tax on the mandatory deemed repatriation of cumulative foreign earnings as of December 31, 2017. In accordance with the Tax Act, the Company recorded \$31.4 million as income tax expense in the fourth quarter of 2017, the period in which the legislation was enacted. The total expense included \$23.3 million related to the transition tax and \$7.3 million related to the remeasurement of certain deferred tax assets and liabilities.

The Company is subject to income tax in the United States as well as other tax jurisdictions in which it conducts business. Earnings from non-U.S. activities are subject to local country income tax. As a result of the concept of “deemed distributions” under the Tax Act, the impact of global intangible low-tax income (“GILTI”) on the Company’s future foreign earnings, and lack of certain foreign governments’ withholding tax imposed on dividends, the Company no longer takes the position that most of its foreign earnings are permanently reinvested. However, for certain foreign operating subsidiaries, the Company continues to take the position that earnings are permanently reinvested. The Company recorded tax expense of \$0.9 million for state taxes related to the future repatriation of earnings which are no longer considered permanently reinvested in the fourth quarter of 2017. As of December 31, 2019, there was \$17.3 million of cumulative foreign earnings for which state income taxes have not been provided.

Deferred Tax Assets and Liabilities

Significant components of the Company’s net deferred tax assets at December 31, 2019 and 2018, are as follows (in thousands):

	December 31,	
	2019	2018
Deferred tax assets:		
Accrued expenses	\$ 8,748	\$ 3,517
Net operating loss carryforwards	16,624	18,641
Credit carryforwards	32,498	21,568
Lease liability	4,690	—
Stock-based compensation	4,200	3,561
Other	808	248
Total deferred tax assets	\$ 67,568	\$ 47,535
Deferred tax liabilities:		
Depreciation	(161)	(1,567)
Right-of-use asset	(5,930)	—
Other	(758)	(868)
Total deferred tax liabilities	(6,849)	(2,435)
Valuation allowance	(8,921)	(6,383)
Net deferred tax assets	\$ 51,798	\$ 38,717

The Company accounts for deferred taxes under ASC Topic 740, *Income Taxes* which involves weighing positive and negative evidence concerning the realizability of the Company’s deferred tax assets in each jurisdiction. The Company evaluated its ability to realize the benefit of its net deferred tax assets and weighed all available positive and negative evidence both objective and subjective in nature. In determining the need for a valuation allowance, the weight given to positive and negative evidence is commensurate with the extent to which the evidence may be objectively verified. Consideration was given to negative evidence such as the duration and severity of losses, as well as the expiration and limitation of tax attributes in various jurisdictions.

As of December 31, 2019, positive evidence included consolidated three-year cumulative profitability of \$61.5 million. Additionally, after determining that sufficient forecasted taxable income of appropriate character is expected to continue in future years, the Company believes the weight of the objectively verifiable positive evidence coupled with the subjective positive evidence from forecasted operating plans is sufficient to overcome the weight of any negative evidence. In the U.S. the GILTI provisions from the Tax Act have created U.S. taxable income and are expected to continue to do so in future years. During the year ended December 31, 2019, the Company concluded it is more likely than not that it will realize the benefit of \$51.8 million of the Company’s net deferred tax assets. The Company maintains a partial valuation allowance of \$8.9 million against certain U.S. deferred tax assets, which include federal net operating loss and credit carryforwards limited under IRC Section 382 as well as certain state and foreign net operating losses and credits accumulated in jurisdictions in which management does not anticipate sufficient taxable income to utilize the credits. Management will continue to assess the applicability of a valuation allowance at each reporting period.

The table below summarizes changes in the deferred tax asset valuation allowance (in thousands):

Year Ended December 31,	Beginning Balance	Additions	Reductions	Ending Balance
2017	\$ 734	682	—	\$ 1,416
2018	\$ 1,416	4,967	—	\$ 6,383
2019	\$ 6,383	2,538	—	\$ 8,921

Tax Rate

A reconciliation of the provision (benefit) for income taxes computed at the statutory federal income tax rate to the (benefit) provision for income taxes as reflected in the consolidated financial statements is as follows:

	Year Ended December 31,		
	2019	2018	2017
Provision for income taxes at statutory rate	21.0 %	21.0 %	35.0 %
(Decreases) increases resulting from:			
Federal tax credits	(29.9)	1,304.6	(15.3)
Change in valuation allowance	11.7	(1,230.7)	1.7
State tax expense, net of federal benefit	(36.4)	1,058.0	(8.0)
Meals and entertainment	0.3	(24.0)	0.4
Stock-based compensation expense	(26.8)	384.1	(32.9)
Change in uncertain tax positions	8.6	(116.5)	3.5
Change in federal rate due to tax reform	—	—	18.0
Transition tax	—	(9.6)	57.7
APB23 state liability	(0.7)	(2.0)	—
Foreign rate differential	(77.3)	1,598.6	(55.5)
Foreign rate inclusion	84.0	(1,990.5)	2.9
Other	(6.2)	323.8	(3.0)
Effective income tax rate	<u>(51.7)%</u>	<u>1,316.8 %</u>	<u>4.5 %</u>

For the year ended December 31, 2019, the Company recorded an income tax benefit of \$11.2 million, representing an effective tax rate of (51.7)%. The effective tax rate differs from the U.S. statutory tax rate primarily as a result of jurisdictional mix of earnings, the stock-based compensation excess tax benefits, and federal and state research and development credits.

Tax Attributes

As of December 31, 2019, the Company had \$42.4 million and \$117.1 million of federal and state net operating loss carryforwards, respectively, that expire at various dates through 2039. In addition, federal net operating loss carryforwards generated after December 31, 2017 are subject to carryforward indefinitely. As of December 31, 2019, the Company had \$17.3 million, \$21.7 million and \$1.3 million of federal, state and foreign research and development and other credit carryforwards, respectively, that expire at various dates through 2039.

Realization of the future tax benefits is dependent on many factors, including the Company's ability to generate taxable income within the net operating loss carryforward period. Utilization of some of the net operating loss carryforwards is subject to an annual limitation due to the ownership percentage change limitations provided by Section 382 of the Internal Revenue Code of 1986 and similar state provisions. The annual limitations will result in the expiration of \$0.8 million of the federal net operating loss carryforwards before utilization. The Company performed an Internal Revenue Code Section 382 study and determined that utilization of its annual net operating losses for periods prior to 2014 are limited to approximately \$4.8 million per year through 2017, \$2.3 million in 2018 and \$1.4 million in years thereafter in connection with changes in control in 2009 and 2013. The Company's operating loss carryforwards for years after 2013 are not limited.

Accounting for Uncertainty in Income Taxes

The Company recognizes, in its consolidated financial statements, the effect of a tax position when it is more likely than not, based on the technical merits, that the position will be sustained upon examination. The aggregate changes in gross unrecognized tax benefits during the years ended December 31, 2019 and 2018 were as follows (in thousands):

Balance at December 31, 2017	\$	4,504
Increases for the tax positions taken during the year		470
Balance at December 31, 2018	\$	4,974
Increases for the tax positions taken during the year		1,857
Balance at December 31, 2019	\$	6,831

The Company had \$6.8 million and \$5.0 million of uncertain tax positions during the years ended December 31, 2019 and 2018, respectively. Included in the balance of unrecognized tax benefits as of December 31, 2019 and 2018 are \$3.6 million and \$3.0 million of tax benefits, respectively, that, if recognized, would impact the effective tax rate. There are no material amounts of interest or penalties recognized in the consolidated income statements or accrued on the consolidated balance sheets for any period presented. The Company does not expect any material changes in these uncertain tax benefits within the next 12 months.

In the normal course of business, the Company is potentially subject to examination by tax authorities throughout the United States and other foreign jurisdictions in which the Company operates. All tax years since inception remain open to examination by the Internal Revenue Service (“IRS”) or state tax authorities, as carryforward attributes generated in prior period tax years may still be adjusted upon examination if they have or will be used in a future period. The Company also files foreign tax returns in the foreign jurisdictions in which it operates when required. The Company is currently being audited by the IRS for tax years 2014 through 2017, the state of New Jersey for tax years 2015 through 2017 and the state of Massachusetts for tax years 2016 through 2018. There are currently no foreign examinations in process.

On July 27, 2015, in *Altera Corp. v. Commissioner*, the U.S. Tax Court issued an opinion invalidating the regulations relating to the treatment of stock-based compensation expense in an intercompany cost-sharing arrangement. A final decision was issued by the Tax Court in December 2015. The IRS appealed the decision in June 2016. On July 24, 2018, the Ninth Circuit Federal Court issued a decision that was subsequently withdrawn and a reconstituted panel conferred on the appeal. On June 7, 2019, the Court of Appeals reversed the 2015 decision of the Tax Court and upheld the cost-sharing regulations. On July 22, 2019, Altera petitioned for a rehearing with the full Court of Appeals, and on November 12, 2019, the court denied that petition. On February 10, 2020, Altera filed a petition asking the United States Supreme Court to review the decision of the Court of Appeals. Due to the uncertainty surrounding the status of the current regulations and questions related to jurisdiction, the Company has determined no adjustment is required to the consolidated financial statements as a result of this ruling. The Company believes that its position which is consistent with the U.S. Tax Court decision in favor of Altera, is more likely than not to be sustained based on the technical merits. As of December 31, 2019, the Company estimates that the potential impact of a final adverse decision could be as much as \$6.3 million on a financial statement basis for prior years’ taxes. The Company will continue to monitor ongoing developments and potential impacts to its consolidated financial statements.

15. CONCENTRATIONS OF RISK

Customer Concentration

Customers with revenue equal to or greater than 10% of total revenue for the years ended December 31, 2019, 2018 and 2017 were as follows:

	Year Ended December 31,		
	2019	2018	2017
A ⁽¹⁾	27%	20%	30%
B	13%	15%	15%
C ⁽²⁾	17%	17%	11%
E	17%	14%	*

* Less than 10% of revenue in the period indicated

- (1) Customer A was subject to U.S. Department of Commerce restrictions that prevented sales to this customer from April 15, 2018 through July 13, 2018.
- (2) Customer C was acquired by one of the Company’s other customers on October 1, 2018. The figures in the table above take into account all revenue for the combined customer for the year ended December 31, 2018 and after. Pro forma revenue for the combined customer would have been 15% for the year ended December 31, 2017.

Customers, which include their authorized contract manufacturers, that accounted for equal to or greater than 10% of accounts receivable at December 31, 2019 and 2018 were as follows:

	December 31, 2019	December 31, 2018
A	28%	30%
B	16%	13%
D	*	10%
F	*	17%
G	10%	*

* Less than 10% of accounts receivable at the date indicated

Supplier Concentration

The Company's most significant vendor spending is related to purchases from contract manufacturers and component suppliers located in China, Thailand and the United States, from which the Company purchases a substantial portion of its inventory. For the years ended December 31, 2019, 2018 and 2017, total purchases from each of the suppliers were as follows:

	Year Ended December 31,		
	2019	2018	2017
X	18%	18%	19%
Y	53%	53%	49%
Z	*	*	10%

* Less than 10% of total purchases in the period indicated

The Company also outsources certain engineering projects to vendors located throughout the world. During the year ended December 31, 2017, the Company incurred 18% of its total research and development costs with one vendor. Costs incurred with this vendor were less than 10% of total research and development costs in the years ended December 31, 2019 and 2018.

16. RETIREMENT PLAN

The Company is the sponsor of a defined contribution savings plan for all qualified employees under Section 401(k) of the Internal Revenue Code (the "401(k) Plan"). The 401(k) Plan allows participants to contribute a portion of their compensation on a pre-tax basis up to an amount not to exceed the annual statutory limit applicable to each individual participant. The Company is permitted to make discretionary matching contributions to the 401(k) Plan. Total matching contributions during the years ended December 31, 2019, 2018 and 2017 amounted to \$1.9 million, \$1.6 million and \$1.3 million, respectively.

17. RELATED PARTIES

One of the members of the Company's board of directors, Vincent Roche, is also the President and Chief Executive Officer and a member of the board of directors of Analog Devices, Inc. ("ADI"). The Company, through its contract manufacturers, periodically purchases supplies from ADI pursuant to purchase orders negotiated on an arm's length basis between ADI and the Company's contract manufacturers at prevailing prices. These purchased supplies are used as content in certain of the Company's manufactured products. Based on shipments during the respective periods, the Company's contract manufacturers made purchases from ADI of approximately \$4.1 million, \$3.8 million, and \$4.5 million, during the years ended December 31, 2019, 2018 and 2017, respectively.

In 2018, the Company entered into a product development agreement with ADI related to the development of integrated circuits for \$1.5 million, of which \$0.3 million and \$0.8 million of costs were incurred during the years ended December 31, 2019 and 2018, respectively.

One of the members of the Company's board of directors, Peter Y. Chung, is also a member of the board of directors of MACOM Technology Solutions, Inc. ("MACOM"). The Company, through its contract manufacturers, periodically purchases supplies from MACOM. These purchased supplies are used as content in certain of the Company's manufactured products. Based on shipments, the Company's contract manufacturers made no purchases from MACOM during the year ended December 31, 2019, and approximately \$0.3 million and \$0.8 million of purchases from MACOM during the years ended December 31, 2018 and 2017, respectively.

18. UNAUDITED QUARTERLY FINANCIAL INFORMATION

	2019			
	First	Second	Third	Fourth
	(in thousands)			
Revenue	\$ 105,216	\$ 111,183	\$ 119,591	\$ 128,673
Cost of revenue	55,374	60,096	60,512	67,999
Gross profit	49,842	51,087	59,079	60,674
Operating expenses:				
Research and development	30,953	28,976	28,649	40,122
Sales, general and administrative	15,787	29,899	20,457	14,438
Total operating expenses	46,740	58,875	49,106	54,560
Income (loss) from operations	3,102	(7,788)	9,973	6,114
Total other income, net	2,394	2,847	2,490	2,509
Income (loss) before benefit for income taxes	5,496	(4,941)	12,463	8,623
Benefit for income taxes	(1,481)	(2,916)	(2,642)	(4,159)
Net income (loss)	\$ 6,977	\$ (2,025)	\$ 15,105	\$ 12,782
Net income (loss) per share:				
Basic	\$ 0.17	\$ (0.05)	\$ 0.37	\$ 0.31
Diluted	\$ 0.17	\$ (0.05)	\$ 0.35	\$ 0.30
	2018			
	First	Second	Third	Fourth
	(in thousands)			
Revenue	\$ 72,941	\$ 65,003	\$ 94,814	\$ 107,133
Cost of revenue	48,870	39,798	49,981	54,122
Gross profit	24,071	25,205	44,833	53,011
Operating expenses:				
Research and development	24,445	24,340	24,696	28,925
Sales, general and administrative	14,288	12,984	12,134	12,458
Total operating expenses	38,733	37,324	36,830	41,383
(Loss) income from operations	(14,662)	(12,119)	8,003	11,628
Total other income, net	1,283	1,300	2,011	2,152
(Loss) income before (benefit) provision for income taxes	(13,379)	(10,819)	10,014	13,780
(Benefit) provision for income taxes	(4,301)	(7,574)	1,863	4,692
Net (loss) income	\$ (9,078)	\$ (3,245)	\$ 8,151	\$ 9,088
Net (loss) income per share:				
Basic	\$ (0.23)	\$ (0.08)	\$ 0.20	\$ 0.23
Diluted	\$ (0.23)	\$ (0.08)	\$ 0.19	\$ 0.22

19. SUBSEQUENT EVENTS

The Company's board of directors approved an increase in the number of shares authorized for issuance under the Company's 2016 Equity Incentive Plan by 1,618,079 shares in accordance with the automatic annual increase provision of such plan, effective as of January 1, 2020.

Item 9. *Changes in and Disagreements with Accountants on Accounting and Financial Disclosure*

None.

Item 9A. *Controls and Procedures*

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a- 15(e) and 15d- 15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”)), as of the end of the period covered by this Annual Report on Form 10-K. Based on such evaluation, our principal executive officer and principal financial officer have concluded that as of such date, our disclosure controls and procedures were effective.

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rule 13a-15(f) or 15d-15(f) promulgated under the Securities Exchange Act of 1934 as a process designed by, or under the supervision of, the company’s principal executive and principal financial officers and effected by the company’s board of directors, management and other personnel, 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 and includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the company;
- 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,
- 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. 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 as of December 31, 2019. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated 2013 Framework.

Based on this assessment, our management concluded that, as of December 31, 2019, our internal control over financial reporting is effective based on those criteria.

The effectiveness of our internal control over financial reporting as of December 31, 2019 has been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report which is included herein.

Inherent Limitations of Internal Controls

Our management, including our Chief Executive Officer and Chief Financial Officer, does not expect that our disclosure controls and procedures or our internal controls will prevent all errors and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within the Company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the control. The design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions, or the degree of compliance with the policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting during our most recently completed fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Acacia Communications, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Acacia Communications, Inc. and subsidiaries (the “Company”) as of December 31, 2019, 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, 2019, 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), the consolidated financial statements as of and for the year ended December 31, 2019, of the Company and our report dated February 18, 2020, expressed an unqualified opinion on those financial statements and included an explanatory paragraph regarding the Company’s adoption of FASB Accounting Standards Update 2016-02, *Leases*.

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. 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

Boston, Massachusetts
February 18, 2020

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The complete response to this Item regarding the backgrounds of our executive officers and directors and other information required by Items 401, 405 and 407 of Regulation S-K will be contained in our definitive proxy statement for our 2020 Annual Meeting of Stockholders.

Code of Business Conduct and Ethics

We have adopted a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. A copy of the code is available on our website, *www.acacia-inc.com*. In addition, we intend to post on our website all disclosures that are required by law or the Nasdaq Listing Rules concerning any amendments to, or waivers from, any provision of the code.

Item 11. Executive Compensation

The information required by this Item is incorporated by reference herein to our definitive proxy statement for our 2020 Annual Meeting of Stockholders.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item is incorporated by reference herein to our definitive proxy statement for our 2020 Annual Meeting of Stockholders.

Securities Authorized for Issuance Under Equity Compensation Plans

The information required by this item with respect to our equity compensation plans is incorporated by reference to our Proxy Statement for the 2020 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this Item is incorporated by reference herein to our definitive proxy statement for our 2020 Annual Meeting of Stockholders.

Item 14. Principal Accountant Fees and Services

The information required by this Item is incorporated by reference herein to our definitive proxy statement for our 2020 Annual Meeting of Stockholders.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a)(1) Financial Statements

Our consolidated financial statements are set forth in Part II, Item 8 of this Annual Report on Form 10-K and are incorporated herein by reference.

(a)(2) Financial Statement Schedules

All financial schedules have been omitted because the required information is either presented in the consolidated financial statements or the notes thereto or is not applicable or required.

(a)(3) Exhibits

The exhibits required by Item 601 of Regulation S-K and Item 15(b) of this Annual Report on Form 10-K are listed in the Exhibit Index below and are incorporated herein.

Exhibit Index

Exhibit	Description
2.1†	<u>Agreement and Plan of Merger, dated as of July 8, 2019, by and among Acacia Communications, Inc., Cisco Systems, Inc. and Amarone Acquisition Corp. (incorporated by reference to Exhibit 2.1 to the first Current Report on Form 8-K filed by the registrant on July 9, 2019).</u>
3.1	<u>Amendment to Amended and Restated By-laws of Acacia Communications, Inc. (incorporated by reference to Exhibit 3.1 to the first Current Report on Form 8-K filed by the registrant on July 9, 2019).</u>
3.2	<u>Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.2 to the Current Report on Form 8-K filed on May 24, 2016).</u>
4.1	<u>Specimen stock certificate evidencing shares of common stock (incorporated by reference to Exhibit 4.1 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
4.2	<u>Amended and Restated Investors' Rights Agreement, dated April 17, 2013, by and among the Registrant and the other parties thereto (incorporated by reference to Exhibit 4.2 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
4.3**	<u>Description of the Registrant's Securities</u>
10.1	<u>Form of Indemnification Agreement for directors and officers (incorporated by reference to Exhibit 10.1 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
10.2*	<u>2009 Stock Plan (incorporated by reference to Exhibit 10.2 to Amendment No. 2 to the Registration Statement on Form S-1 filed May 2, 2016).</u>
10.3*	<u>Forms of Stock Option Agreement under 2009 Stock Plan (incorporated by reference to Exhibit 10.3 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
10.4*	<u>Form of Restricted Stock Unit Agreement under 2009 Stock Plan (incorporated by reference to Exhibit 10.4 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
10.5*	<u>Form of Restricted Stock Agreement under 2009 Stock Plan (incorporated by reference to Exhibit 10.5 to the Registration Statement on Form S-1 filed December 21, 2015).</u>
10.6*	<u>2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.6 to Amendment No. 1 to the Registration Statement on Form S-1 filed February 24, 2016).</u>
10.7*	<u>Form of Incentive Stock Option Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.7 to Amendment No. 1 to the Registration Statement on Form S-1 filed February 24, 2016).</u>
10.8*	<u>Form of Non-statutory Stock Option Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.8 to Amendment No. 1 to the Registration Statement on Form S-1 filed February 24, 2016).</u>
10.9*	<u>Form of Restricted Stock Unit Agreement under 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.9 to Amendment No. 1 to the Registration Statement on Form S-1 filed February 24, 2016).</u>
10.10*	<u>Amended and Restated 2016 Employee Stock Purchase Plan (incorporated by reference to Exhibit 99.2 to the Registration Statement on Form S-8 filed February 23, 2017).</u>
10.11*	<u>Amended and Restated Severance and Change in Control Benefits Plan (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q filed on August 2, 2018).</u>
10.12††	<u>General Conditions of Purchase, dated December 3, 2010, by and between the Registrant and ZTE Corporation (incorporated by reference to Exhibit 10.17 to Registration Statement on Form S-1 filed December 21, 2015).</u>

- 10.13†† [Master Supply Agreement, dated October 18, 2013, by and between the Registrant and Fujitsu Semiconductor America, Inc. \(incorporated by reference to Exhibit 10.18 to Registration Statement on Form S-1 filed December 21, 2015\).](#)
- 10.14†† [Manufacturing Services Agreement, dated as of August 6, 2015, by and between the Registrant and Sanmina Corporation \(incorporated by reference to Exhibit 10.19 to Registration Statement on Form S-1 filed December 21, 2015\).](#)
- 10.15 [Lease, dated April 13, 2016, by and between the Registrant and AS Clock Tower Owner, LLC \(incorporated by reference to Exhibit 10.20 to Amendment No. 2 to the Registration Statement on Form S-1 filed May 2, 2016\).](#)
- 10.16 [Commercial Lease, dated March 18, 2016, by and between the Registrant and Somerset Holmdel Development I Urban Renewal, L.P. \(incorporated by reference to Exhibit 10.21 to Amendment no. 2 to Registration Statement on Form S-1 filed May 2, 2016\).](#)
- 10.17†† [Master Purchase Agreement, dated November 11, 2016, by and between the Registrant and Cisco Systems, Inc.](#)
- 10.18†† [Master Purchase Agreement, dated November 11, 2016, by and between the Registrant and Cisco Systems, International B.V.](#)
- 10.19†† [Addendum to the Master Purchase Agreements, dated July 8, 2019, by and among the Registrant, Cisco Systems, Inc. and Cisco Systems, International B.V.](#)
- 21.1** [List of Subsidiaries.](#)
- 23.1** [Consent of Deloitte & Touche LLP, independent registered public accounting firm.](#)
- 31.1** [Certification of Principal Executive Officer Pursuant to Rules 13a-14\(a\) and 15d-14\(a\) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.](#)
- 31.2** [Certification of Principal Financial Officer Pursuant to Rules 13a-14\(a\) and 15d-14\(a\) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.](#)
- 32.1*** [Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.](#)
- 32.2*** [Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.](#)
- 101.INS** XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
- 101.SCH** Inline XBRL Taxonomy Extension Schema Document.
- 101.CAL** Inline XBRL Taxonomy Extension Calculation Linkbase Document.
- 101.DEF** Inline XBRL Taxonomy Extension Definition Linkbase Document.
- 101.LAB** Inline XBRL Taxonomy Extension Label Linkbase Document.
- 101.PRE** Inline XBRL Taxonomy Extension Presentation Linkbase Document.
- 104** Cover Page Interactive Data File (formatted as inline XBRL with applicable taxonomy extension information contained in Exhibits 101).

* Indicates management contract or compensatory plan or arrangement.

- ** Filed herewith.
- *** Furnished herewith.
- † Schedules have been omitted pursuant to Item 601(b)(2) of Regulation S-K. The Company hereby undertakes to furnish supplemental copies of any of the omitted schedules upon request by the SEC.
- †† Confidential treatment requested as to certain portions, which portions have been omitted and filed separately with the Securities and Exchange Commission.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ACACIA COMMUNICATIONS, INC.

By: /s/ Murugesan Shanmugaraj

Murugesan Shanmugaraj

President and Chief Executive Officer

Date: February 18, 2020

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
<u>/s/ Murugesan Shanmugaraj</u> Murugesan Shanmugaraj	President, Chief Executive Officer and Director (Principal Executive Officer)	February 18, 2020
<u>/s/ John F. Gavin</u> John F. Gavin	Chief Financial Officer (Principal Financial Officer)	February 18, 2020
<u>/s/ Francis J. Murphy</u> Francis J. Murphy	Vice President and Corporate Controller (Principal Accounting Officer)	February 18, 2020
<u>/s/ Vincent Roche</u> Vincent Roche	Chairman of the Board of Directors	February 18, 2020
<u>/s/ David Aldrich</u> David Aldrich	Director	February 18, 2020
<u>/s/ Peter Y. Chung</u> Peter Y. Chung	Director	February 18, 2020
<u>/s/ Benny P. Mikkelsen</u> Benny P. Mikkelsen	Director	February 18, 2020
<u>/s/ Stan J. Reiss</u> Stan J. Reiss	Director	February 18, 2020
<u>/s/ John Ritchie</u> John Ritchie	Director	February 18, 2020
<u>/s/ Laurinda Y. Pang</u> Laurinda Y. Pang	Director	February 18, 2020

**DESCRIPTION OF THE REGISTRANT'S SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF THE
SECURITIES EXCHANGE ACT OF 1934**

The following summary of our securities is not a complete description and is based on and qualified by our restated certificate of incorporation (as amended, the "Certificate of Incorporation") and amended and restated by-laws ("By-laws"). For a complete description of the terms and provisions of our equity securities, including our common stock, refer to the Certificate of Incorporation and By-Laws, both of which are filed as exhibits to this Annual Report on Form 10-K. As used in this "Description of Registrars Securities Registered Pursuant to Section 12 of the Security Exchange Act of 1934," the terms "Company," "we," "our" and "us" refer to Acacia Communications, Inc.

General

Our authorized capital stock consists of 150,000,000 shares of common stock, par value \$0.0001 per share, and 5,000,000 shares of preferred stock, par value \$0.0001 per share. The following description of our capital stock and provisions of our Certificate of Incorporation and By-laws are summaries and are qualified by reference to the Certificate of Incorporation and amended and By-laws.

Common Stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of any series of preferred stock that we may designate and issue in the future.

In the event of our liquidation or dissolution, the holders of common stock are entitled to receive proportionately our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock. Holders of common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred Stock

Under the terms of our Certificate of Incorporation, our board of directors is authorized to direct us to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock. There are no shares of preferred stock outstanding, and we have no present plans to issue any shares of preferred stock.

Provisions of Our Certificate of Incorporation and By-laws and Delaware Law That May Have Anti-Takeover Effects

Delaware Law

We are subject to Section 203 of the Delaware General Corporation Law ("DGCL"). Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our

**DESCRIPTION OF THE REGISTRANT'S SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF THE
SECURITIES EXCHANGE ACT OF 1934**

outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Staggered Board; Removal of Directors

Our Certificate of Incorporation and our By-laws divide our board of directors into three classes with staggered three-year terms. In addition, a director may be removed only for cause and only by the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in an annual election of directors. Any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

The classification of our board of directors and the limitations on the removal of directors and filling of vacancies could make it more difficult for a third party to acquire, or discourage a third party from seeking to acquire, control of our company.

Supermajority Voting

The DGCL provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws, unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our By-laws may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in an election of directors is required to amend, repeal, or adopt any provisions inconsistent with, any of the provisions of our Certificate of Incorporation as described in the prior two paragraphs.

Stockholder Action; Special Meeting of Stockholders

Our Certificate of Incorporation provides that any action required or permitted to be taken by our stockholders must be effected at a duly called annual or special meeting of such stockholders and may not be effected by any consent in writing by such stockholders. Our Certificate of Incorporation and our By-laws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by our chairman of the board, our chief executive officer or our board of directors.

Authorized but Unissued Shares

The authorized but unissued shares of our common stock and preferred stock are available for future issuance without stockholder approval, subject to any limitations imposed by the Nasdaq Listing Rules.

These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Subsidiaries of the Registrant

Name of Subsidiary	Jurisdiction of Organization
Acacia Communications (Canada) Limited	Canada
Acacia Communications Europe ApS	Denmark
Acacia Communications Holdings, Ltd.	Bermuda
Acacia Communications (Ireland) Limited	Ireland
Acacia Communications (Germany) GmbH	Germany
Acacia Communications (Shenzhen) Limited	China
ACIA Communications Technology (India) Private Limited	India
Acacia Technologies (UK) Limited	United Kingdom

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-211335, 333-216200, 333-223153 and 333-229770 on Form S-8 of our reports dated February 18, 2020, relating to the financial statements of Acacia Communications, Inc. and subsidiaries, and the effectiveness of Acacia Communications, Inc. and subsidiaries' internal control over financial reporting appearing in this Annual Report on Form 10-K for the year ended December 31, 2019.

/s/ Deloitte & Touche LLP

Boston, Massachusetts

February 18, 2020

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Murugesan Shanmugaraj, certify that:

1. I have reviewed this Annual Report on Form 10-K of Acacia Communications, Inc.;
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(s) 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; and
5. The Registrant's other certifying officer(s) 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.

Acacia Communications, Inc.

Date: February 18, 2020

By: _____ /s/ Murugesan Shanmugaraj

Murugesan Shanmugaraj
President and Chief Executive Officer

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, John F. Gavin, certify that:

1. I have reviewed this Annual Report on Form 10-K of Acacia Communications, Inc.;
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(s) 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; and
5. The Registrant's other certifying officer(s) 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.

Acacia Communications, Inc.

Date: February 18, 2020

By: _____ /s/ John F. Gavin

John F. Gavin
Chief Financial Officer

