UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 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**

Commission File Number: 001-37956

XPERI CORPORATION
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**81-4465732**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
3025 Orchard Parkway, San Jose, California	**95134**
(Address of Principal Executive Offices)	**(Zip Code)**

(408) 321-6000
(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, par value $0.001 per share	XPER	The Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. 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 Securities Exchange 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 for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

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

Indicate by check mark 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 Securities Exchange Act). Yes ☐ No ☒

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of June 30, 2019 was $732,852,355 (based on the closing sale price of the registrant's common stock as reported on The Nasdaq Global Select Market).

The number of shares outstanding of the registrant's common stock as of February 7, 2020 was 49,861,846.

DOCUMENTS INCORPORATED BY REFERENCE:

None.

XPERI CORPORATION

ANNUAL REPORT ON FORM 10-K

FOR THE YEAR ENDED DECEMBER 31, 2019

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Cautionary Statement Regarding Forward-Looking Statements

This Annual Report contains forward-looking statements, which are subject to the safe harbor provisions created by the Private Securities Litigation Reform Act of 1995. Words such as "expects," "anticipates," "plans," "believes," "seeks," "estimates," "could," "would," "may," "intends," "targets" and similar expressions or variations of such words are intended to identify forward-looking statements, but are not the exclusive means of identifying forward-looking statements in this Annual Report. The identification of certain statements as "forward-looking" is not intended to mean that other statements not specifically identified are not forward-looking. All statements other than statements about historical facts are statements that could be deemed forward-looking statements, including, but not limited to, statements that relate to our future revenue, product development, demand, acceptance and market share, growth rate, competitiveness, gross margins, levels of research, development and other related costs, expenditures, the outcome or effects of and expenses related to litigation and administrative proceedings related to our patents, our intent to enforce our intellectual property, our ability to license our intellectual property, tax expenses, cash flows, our ability to liquidate and recover the carrying value of our investments, our management's plans and objectives for our current and future operations, our plans for quarterly dividends and stock repurchases, the levels of customer spending or research and development activities, general economic conditions, and the sufficiency of financial resources to support future operations and capital expenditures.

Although forward-looking statements in this Annual Report reflect the good faith judgment of our management, such statements can only be based on facts and factors currently known by us. Consequently, forward-looking statements are inherently subject to risks, uncertainties, and changes in condition, significance, value and effect, including those discussed below under the heading "Risk Factors" within Part I, Item 1A of this Annual Report and other documents we file from time to time with the Securities and Exchange Commission (the "SEC"), such as our annual reports on Form 10-K, our quarterly reports on Form 10-Q and our current reports on Form 8-K. Such risks, uncertainties and changes in condition, significance, value and effect could cause our actual results to differ materially from those expressed herein and in ways not readily foreseeable. Readers are urged not to place undue reliance on these forward-looking statements, which speak only as of the date of this Annual Report and are based on information currently and reasonably known to us. We undertake no obligation to revise or update any forward-looking statements in order to reflect any event or circumstance that may arise after the date of this Annual Report. Readers are urged to carefully review and consider the various disclosures made in this Annual Report, which attempt to advise interested parties of the risks and factors that may affect our business, financial condition, results of operations and prospects.

PART I

Item 1. Business

Corporate Information

Our principal executive offices are located at 3025 Orchard Parkway, San Jose, California 95134 USA. Our telephone number is +1 (408) 321-6000. We maintain a corporate website at www.xperi.com. The reference to our website address does not constitute incorporation by reference of the information contained on this website. Xperi, the Xperi logo, Tessera, the Tessera logo, DTS, the DTS logo, FotoNation, the FotoNation logo, Invensas, the Invensas logo, BVA, ZiBond, DBI, DTS-*HD*, DTS Audio Processing, DTS:X Ultra, DTS Virtual:X, DTS Headphone:X, DTS Play-Fi, DTS:X and HD Radio are trademarks or registered trademarks of Xperi Corporation or its affiliated companies in the U.S. and other countries. All other company, brand and product names may be trademarks or registered trademarks of their respective companies.

In this Annual Report, the "Company," "we," "us" and "our" refer to Xperi Corporation ("Xperi"), which operates its business through its subsidiaries. Unless specified otherwise, the financial results in this Annual Report are those of the Company and its subsidiaries on a consolidated basis.

Overview

Xperi is a publicly-traded technology company with headquarters in Silicon Valley and operations around the world. Through its operating subsidiaries, Xperi creates, develops and licenses innovative audio, imaging, semiconductor packaging and interconnect technologies. We have approximately 700 employees and nearly 30 years of operating experience.

We completed the acquisition of DTS, Inc. ("DTS"), a publicly-traded developer of sound-based technologies, in December 2016. At the time of the acquisition, Tessera Technologies, Inc. and DTS were combined under the newly-formed Tessera Holding Corporation. During the first quarter of 2017, we introduced our new corporate name, Xperi Corporation, launched a new corporate logo, and began trading under a new ticker symbol XPER.

On December 18, 2019, we entered into an Agreement and Plan of Merger and Reorganization (the "Merger Agreement") with TiVo Corporation ("TiVo") to combine in an all-stock merger of equals transaction (the "Mergers"). The transaction will create a leading consumer and entertainment technology licensing business and one of the industry's largest intellectual property (IP) licensing platforms, with a diverse portfolio of entertainment and semiconductor intellectual property. The Mergers are expected to close and become effective (the "Effective Time") during the second quarter of 2020, subject to regulatory approvals, the approval by the shareholders of each company, and other customary closing conditions.

Subject to the terms and conditions of the Merger Agreement, each share of Xperi common stock ("Xperi Common Stock") issued and outstanding immediately prior to the Effective Time, excluding any shares of Xperi Common Stock that are held in treasury, will be converted into the right to receive one share of common stock of the combined company and each share of TiVo common stock ("TiVo Common Stock") issued and outstanding immediately prior to the Effective Time, excluding any shares of TiVo Common Stock that are held in treasury, will be converted into the right to receive 0.455 shares of common stock of the combined company. On a pro forma, fully diluted basis, it is expected that immediately following the Effective Time, Xperi stockholders will own approximately 46.5% of the combined company and TiVo stockholders will own approximately 53.5% of the combined company.

In connection with the Merger Agreement, Xperi and TiVo obtained a debt commitment letter from Bank of America, N.A., Royal Bank of Canada, and Barclays Bank PLC to provide a senior secured first lien term loan B facility in an aggregate principal amount of $1,100 million (the "Debt Financing"), subject to the terms and conditions set forth therein. The proceeds from the Debt Financing may be used (i) to pay fees and expenses incurred in connection with the Mergers and the related transactions, (ii) to accomplish the refinancing of existing indebtedness of Xperi and TiVo, and (iii) to the extent of any remaining amounts, for working capital and other general corporate purposes. For further discussion of the planned merger with TiVo, refer to "Item 1A. *Risk Factors*," and "Note 9 – *Acquisitions, Goodwill and Identified Intangible Assets*" in the Notes to Consolidated Financial Statements.

Xperi's portfolio of products and technologies uniquely positions us to deliver innovative audio, imaging and semiconductor solutions for the home, automotive and mobile markets. Our products and technologies also enable entertainment media ecosystem connectivity and new products in emerging markets such as Internet of Things (IoT) and Augmented Reality/Virtual Reality (AR/VR). Our team of more than 400 world-class engineers is focused on creating core technologies that enable intelligent, immersive, and personalized experiences.

We license our innovative products, technologies and inventions to global electronics and media companies which, in turn, integrate these solutions into their own consumer electronics and semiconductor products. Our technologies and inventions are widely adopted and used every day by millions of people. Our audio and imaging technologies have shipped in billions of devices for the home, automotive, and mobile markets. Our semiconductor packaging and interconnect technologies have been licensed to more than 100 customers and have shipped in over a hundred billion semiconductor chips.

Xperi operates in two segments. The Product Licensing segment is comprised of our Audio and Imaging businesses, which we license through the DTS, HD Radio, and IMAX Enhanced brands. These licenses typically include the delivery of software and/or hardware-based solutions to our customers or to their suppliers. Product Licensing revenue is derived primarily from sales into the home, automotive and mobile markets.

The Semiconductor and IP Licensing segment includes our Tessera, Invensas and Invensas Bonding Technologies subsidiaries, which license semiconductor packaging and interconnect technologies and associated intellectual property. Semiconductor and IP Licensing revenue is derived from technology and IP licenses to semiconductor companies, foundries and packaging companies. We have a long history of developing and monetizing next-generation technologies, including chip-scale and multi-chip packaging solutions as well as low-temperature wafer and die bonding solutions. Today, we are actively developing and licensing 3D semiconductor packaging, interconnect and bonding solutions for semiconductors that are used in every day products such as smartphones, tablets, and laptops as well as servers used in datacenters. We also provide engineering services to our customers to assist them in their evaluation and adoption of our technologies including the transition into high volume production.

Product Licensing Segment

Overview of Solutions

The Product Licensing segment is comprised of solutions from our audio and imaging businesses.

Audio Solutions: Our audio business is a premier audio technology solutions provider for high definition entertainment experiences. The DTS codec is designed to enable recording, delivery and playback of immersive high definition audio and is incorporated by hundreds of customers around the world into an array of consumer electronics devices for use anywhere, at home, in the car, or on the go. We provide products and services to entertainment media ecosystem partners such as motion picture studios, radio and TV broadcasters, game developers and other content creators to facilitate the inclusion of compelling, realistic DTS-encoded audio within their content. This in turn allows consumers to experience immersive and compelling audio wherever they choose to enjoy it. Devices that incorporate DTS audio codec technology include televisions (TVs), personal computers (PCs), smartphones, tablets, automotive entertainment systems, set top boxes (STBs), video game consoles, Blu-ray Disc players, audio/video receivers (AVRs), soundbars, wireless speakers and home theater systems. We also offer DTS post-processing audio solutions designed to enhance the entertainment experience for users of consumer electronics devices, particularly those subject to the physical limitations of smaller speakers, such as TVs, PCs and mobile devices. In addition, our DTS PlayFi technology leverages our audio and technology expertise to enable a variety of high-quality audio playback options across wireless speakers, set top boxes, TVs and mobile devices.

Digital Radio Solutions: Our digital radio solutions, HD Radio and DTS Connected Radio, are a key part of our automotive audio business. HD Radio is the only digital terrestrial broadcast system approved by the Federal Communications Commission (FCC) for AM/FM radio in the U.S., offering additional channels, crystal-clear sound and advanced data services with no subscription fees. HD Radio enables a high quality in-vehicle radio experience with innovative features and digital capabilities. DTS Connected Radio is a global system that enables car makers to utilize a single platform to deliver an enhanced radio experience across different analog and digital broadcast systems deployed regionally. Utilizing an IP connection installed in a vehicle, DTS Connected Radio delivers an innovative analog AM/FM and digital (DAB and HD Radio) experience by pairing broadcast programming with IP-delivered content.

Imaging Solutions: Our subsidiary, FotoNation, a pioneer in computer vision and computational imaging solutions, provides critical imaging technologies that enable millions of consumers to take incredible pictures with their smartphones. Our FotoNation imaging products were rebranded to DTS in January 2020. These technologies underpin many of the features today’s digital users enjoy every day such as advanced portrait modes, face detection and tracking, and automatic effects such as face beautification. Our imaging technologies have become must-have capabilities for mobile device manufacturers and are key to enabling our in-cabin monitoring solutions in the car.

Innovative Technology

Within our audio product line, we have a complete range of end-to-end solutions from content creation / mastering, through distribution and playback. We continue to expand our offerings through ongoing research and development, and strategic partnerships with content creators, chip makers, consumer electronics manufacturers, and others within the digital media ecosystem. Our innovative solution offerings are tailored specifically for each market.

Some of the audio technologies we license include:

- DTS:X® is our flagship object-based audio decoder. The technology includes object-based audio decoding, full backward compatibility with all DTS-encoded formats, and Neural:X, the latest spatial remapping technology that translates legacy bitstreams and PCM content to virtually any speaker layout.
- DTS-HD® Master Audio is our advanced surround sound decoder that utilizes variable bit-rate technology to deliver ultimate audio quality while conserving file size and bandwidth, allowing for an uncompromised audio experience.
- HD Radio™ technology enables digital AM/FM broadcast radio, creating significant benefits to all participants in the radio broadcasting ecosystem. In particular, radio listeners enjoy upgraded audio quality, expanded content choices, and new digital services.
- DTS:X Ultra™ is designed for gaming and XR experiences with support for static, multi-channel and object-based audio. The technology is now supported in the Windows Spatial Sound PC Gaming platform.
- DTS Headphone:X® includes our integrated surround sound technology and DTS decoder, coupled with user-driven, headphone-specific tuning and personalization features for an enhanced listening experience over headphones.
- DTS Clear Voice is an advanced audio input processing technology that delivers real-time voice filters to reduce noise and make one’s voice sound richer, cleaner, and more professional for streaming or online live game play.
- DTS Play-Fi® is a smart audio platform that enables high-quality, multi-room, synchronized streaming of music directly from a variety of sources to speakers over Wi-Fi. Play-Fi is currently embedded in wireless speakers from many of the industry’s leading brands, in leading set top boxes, smart TVs and for mobile devices that use the Android, Kindle Fire or iOS operating systems, as well as the Windows PC platform.
- IMAX Enhanced program, which Xperi manages and licenses to CE customers worldwide, delivers the ultimate home cinema experience with unique IMAX cinematic content that leverages the DTS:X audio format to flawlessly deliver signature IMAX audio mixes.

The proliferation of connected devices that can support streaming and downloadable content has made our active participation within the digital ecosystem increasingly important, as the availability of DTS-encoded content helps drive consumer demand for electronics that support DTS technologies.

Our immersive audio solutions, such as DTS-HD and DTS:X, empower content creators and are supported by all the major Hollywood studios, many cinema operators in the U.S. and Asia, and leading streaming service providers in the U.S., Europe and Asia. On the radio front, our HD Radio broadcast technology provides compelling advantages to consumers over traditional radio and is accordingly supported by more than 2,300 radio stations, including 98 of the top 100 stations in the top 10 U.S. radio markets.

Our imaging business licenses software solutions and technologies for the automotive and mobile imaging markets. Some of the solutions we license include:

- DTS In-Cabin Monitoring (ICM) System includes driver monitoring systems (DMS) and occupant monitoring systems (OMS) to enable a full suite of detection and analysis products for automakers. These technologies enable state-of-the-art attentiveness assessment and fatigue detection for the driver as well as in-cabin monitoring and customization options, based on occupant detection and analysis.
- DTS FaceSafe is a 3D face recognition solution for mobile devices. It features a cohesive set of convolutional neural network (CNN) technologies that enable full face detection and tracking, accurate feature detection, face modeling, texture and depth-based recognition, and liveliness detection.
- DTS 3D Portrait is the next evolution of our portrait enhancement suite. Through AI-based 3D relighting technology coupled with background processing, 3D Portrait enables enhancement of photos and videos created by single and multiple depth sensing cameras. 3D Portrait’s relighting capacity in video-preview mode showcases how changing the light source position in the frame will affect the outcome in real-time.

- DTS Electronic Image Stabilization (EIS) improves the user experience in smartphones when taking photos or recording video. Our EIS solution delivers lightning-fast image processing with best-in-class motion estimation, filtering and correction. The product eliminates the effect of hand jitter and flight navigation vibration correcting for 6 degrees of freedom, including rotation, translation, lens distortion and rolling shutter effects.
- DTS IrisXR is a highly effective iris authentication product. The solution enables iris detection and recognition that provides a layer of safety and security with the potential to become a primary driver for augmented and virtual reality experiences.
- DTS Image Processing Unit (IPU) is our unique collection of IP Cores that enable ultra-low power, low memory size, and low bandwidth consumption when using our or third-party imaging solutions. IPU is multi-use, feature rich, and programmable. These cores are ideal for enabling intelligence on the edge where power, form factor, privacy, and security are key factors.

Product Delivery

Traditionally, our technologies are delivered as software code on integrated circuit (IC) chips. We license a defined and limited set of rights to incorporate our technology into these IC chips, and the IC manufacturers deliver these Xperi-enabled chips to our customers, the consumer electronics products manufacturers. We also work closely with the world's leading IC manufacturers to enable support for our technologies on the new programmable architectures that fuel innovation and flexibility in today's consumer electronics products. Our partners specialize in key vertical markets and work closely with us to enable our latest technologies for these programmable parts. Together, we license these solutions to Xperi's consumer electronics products customers.

We have devoted significant time and resources to develop a broad range of solutions with key partners including Amlogic, Analog Devices, Cadence, Cirrus Logic, Mediatek, Mstar, NXP, Qualcomm, Realtek, Synaptics, Texas Instruments, and others.

In our automotive business, we engage directly with leading global auto manufacturers as well as their Tier-1 suppliers to get our radio products designed and delivered into the car. We also work with radio broadcasters to support the adoption and implementation of our HD radio technology.

Our imaging business combines proprietary hardware design with software development to offer advantages in both processing speed and lower power, providing distinctive features to smartphones, drones, activity cameras and other battery-powered devices. We license our hardware designs to customers who, in turn, typically embed the hardware as modules within a larger chip. Our software typically runs on a microprocessor with capabilities that are augmented by our hardware design within a customer's system.

Customers

We have licensed our audio technologies and related trademarks to substantially all of the major consumer electronics product manufacturers worldwide. These customers include Denso, Harman, Hisense, LG, Microsoft, Panasonic, Samsung and Sony, among others. Our HD Radio technology is incorporated into a number of our automotive partners' products, including vehicles from Acura, Audi, BMW, Ford, GM, Honda, Hyundai, Tesla, and Toyota, among many others.

Our imaging technologies and products have been licensed to mobile phone and digital camera manufacturers worldwide, including to LG, Nikon, Oppo, Socionext, ZTE and others.

Research & Development

As demonstrated by our portfolio of industry-recognized, widely-deployed advanced technologies, we have a long track record of innovating in the fields of audio and imaging. Our audio business was founded nearly 30 years ago on the basis of developing a unique audio solution for cinemas. Today, through a collection of world-class talent and strong research and development capabilities, we continue to focus on providing unique, cost effective and differentiated audio solutions for an ever larger universe of addressable markets.

Our imaging business was founded over 20 years ago, with the idea of connecting digital imaging devices to other computing platforms and enhancing the imaging experience for consumers. Starting with imaging research and advanced algorithm development, FotoNation pioneered a hybrid hardware-software delivery mechanism that has enabled the industry's foremost low-power, high performance imaging capabilities on hand-held and edge devices. We have ongoing investment in world-class R&D supported by strong relationships with key OEMs and platform providers in consumer electronics.

Intellectual Property Portfolio

As of December 31, 2019, our subsidiaries comprising the Product Licensing segment owned approximately 1,224 United States patents and patent applications, as well as approximately 1,619 foreign patents and patent applications. The last of the issued patents to expire is in 2039.

Strategy

Our product licensing business is primarily focused on three markets: home, automotive and mobile devices. In addition to the market specific strategies discussed below, we have also funded a new subsidiary focused on delivering a new machine learning-based hardware and software platform. This new platform combines work on advanced machine learning with our unique experience in imaging, audio and semiconductor technologies. We intend to initially target the smart consumer electronics market with this new platform. This market is expected to be comprised of billions of devices across IoT, in home, mobile and automotive applications. We believe the new platform will enable us to provide advanced imaging and audio applications, as well as a range of new applications that utilize other types of sensing capabilities. Importantly, we believe this platform will allow us to bring a more complete solution to customers, migrating us further up the value chain, increasing both addressable market size and average selling prices of our products.

Home Market Strategy

The Home market consists of TVs, Blu-ray stand-alone players, Audio/Video Receivers, sound bars, wireless speakers, game consoles, set-top-boxes, and smart home cameras and sensors.

Our business strategy in the home market is focused on the following drivers:

- Driving the proliferation of DTS-encoded content among Hollywood studios and digital distribution partners,
- Investing in and broadening the OEM and IC footprints that support DTS technologies,
- Expanding the DTS:X and IMAX Enhanced programs from AVRs and sound bars to source devices - TVs and OTT/STB (Over-The-Top Streaming/Set-Top-Box), and
- Developing and bringing to market a strong pipeline of innovative technology solutions including AI applications related to voice and image sensors.

Automotive Market Strategy

In the Automotive market, we serve automotive OEMs and tier one automotive suppliers who deliver in dash infotainment clusters and in-cabin monitoring solutions enabling personalized infotainment, comfort and safety solutions.

Our business strategy in the Automotive market is focused on the following drivers:

- Proliferating digital radio and auxiliary data services such as traffic, local weather and enhanced content,
- Globalizing advanced digital radio solutions, including DTS Connected Radio, and
- Developing and bringing to market integrated In Cabin Monitoring Solutions, such as driver monitoring (DMS) and occupant monitoring (OMS) based on our industry-leading knowledge of computer vision, embedded machine learning design capability and automotive connectivity technologies.

Mobile Market Strategy

The Mobile market consists of smartphones, tablets, PCs and gaming headsets, as well as emerging opportunities such as Augmented Reality, Virtual Reality and Mixed Reality (AR/VR/MR).

Our business strategy in the Mobile market is focused on the following drivers:

- Licensing DTS Headphone:X, DTS:X Ultra and DTS Clear Voice audio solutions embedded in industry leading game platforms for immersive and engaging gaming experience on laptops, PCs, smart phones and gaming headsets,
- Leveraging our long-time industry leadership in computer vision technology focused on human subjects to develop integrated solutions for image capture to enhance photo and 5G videography,
- Developing and delivering integrated imaging solutions for biometrics and user authentication,

- Further enhancing our imaging solutions with the application of artificial intelligence-based machine learning to our industry-leading database of 20 million real life images, and
- Delivering premium content and DTS-branded entertainment experiences for applications such as movies, gaming, AR/VR/MR.

Competition

Our product licensing business faces competition from other third-party providers of similar solutions as well as internal engineering and design groups among industry IC provider and consumer electronic manufacturers.

In the audio market, our primary competitor is Dolby Laboratories, which develops and markets, among other things, high‑definition audio products and services. Dolby's long‑standing market position, brand, business relationships, resources and inclusion in various industry standards provide it with a strong competitive position.

In addition to Dolby, we compete in specific product markets with companies such as Fraunhofer IIS and various other consumer electronics product manufacturers. Many of these competitors have a wide variety of strengths that afford them competitive advantages, such as longer operating histories, greater resources, greater name recognition, or the ability to offer their technologies for a lower price or for free. We have historically competed effectively against these competitors due in part to our ability to position our brand as a premium offering that contains superior proprietary technology, the quality of our customer service, our inclusion in industry standards and our industry relationships.

Our HD Radio and DTS Connected Radio solutions face competition from subscription-based digital service providers such as Sirius/XM, Pandora, Gracenote, and other digital audio and data service providers.

Our image processing technologies broadly compete with other image processing software vendors such as ArcSoft, Inc., as well as engineering and design groups of mobile phone and digital camera manufacturers that seek to provide similar technologies by employing different approaches. Over time, we expect to see new competitors and other competing technologies emerge.

Semiconductor and IP Licensing Segment

The Semiconductor and IP Licensing Segment licenses semiconductor packaging and interconnect technologies and related IP. These technology and IP assets are licensed primarily through our subsidiaries, Tessera, Invensas and Invensas Bonding Technologies. Tessera's research and development led to significant innovations in semiconductor packaging technology. We patented these innovations, often referred to as chip-scale and multi-chip packaging, which have been widely adopted in the electronics industry. The wave of adoption was initially led by Intel Corporation, and over time, many semiconductor companies and outsourced assembly and test (OSAT) companies entered into technology and patent license agreements with Tessera, Inc.

Invensas Corporation develops next generation semiconductor packaging and interconnect technologies for memory, mobile, computing and automotive applications. For these applications, Invensas innovates in four primary areas: (i) memory, including DRAM and NAND, (ii) sensing, including imaging and time-of-flights sensors, (iii) RF, including switches and filters, and (iv) 2.5D and three-dimensional integrated circuit (3D-IC) assemblies. Invensas engineering teams develop and prototype these technologies in advanced processing and assembly laboratories, as well as perform reliability and acceptance testing. Invensas builds collaborative partnerships with world-class manufacturing companies and high-volume equipment and materials suppliers and licenses its technology solutions to original equipment manufacturers (OEMs), original design manufacturers (ODMs), integrated device manufacturers (IDMs), fabless device suppliers, foundries, and outsourced assembly and test (OSATs) providers. Invensas also transfers its technologies to customer-designated manufacturing sites to support technology bring-up and product commercialization.

Within each of these areas of innovation (memory, sensing, RF and 2.5D/3D-IC), Invensas has created specific product solutions that address critical needs in the market. For example, Invensas innovates in the 3D-IC space. 3D-IC, which typically includes Through-Silicon Vias (TSVs), is widely expected to be the next major trend in the semiconductor industry and is applicable to multiple markets, including mobile, computing, data storage, and networking. In August of 2015, we augmented our 3D-IC portfolio with the acquisition of Ziptronix, Inc. (now known as Invensas Bonding Technologies, Inc.), a leading developer of low temperature wafer bonding technologies, which are targeted at the image sensor, DRAM, NAND, RF, MEMS, and 2.5D and 3D-IC markets. Wafer and die bonding technologies have become increasingly important as the industry continues to look toward 3D-IC solutions to drive performance, functionality and cost gains beyond conventional Moore's Law scaling.

Our ZiBond® technology is a low temperature homogenous (e.g. oxide-to-oxide) direct bonding solution that forms strong bonds between wafers or die with the same or different coefficients of thermal expansion (CTE). ZiBond offers multiple benefits over conventional bonding techniques such as adhesives, anodic bonding, eutectic bonding and glass frit. Bonding is performed at room temperature, which enhances overall yield and reliability by eliminating the negative effects associated with CTE mismatch, warpage and distortion. Higher throughput and lower cost-of-ownership are realized by using industry-standard manufacturing equipment, such as wafer aligners and bonders.

Our DBI® and DBI® Ultra technologies are low temperature hybrid direct bonding solutions that allow wafers or die to be bonded with exceptionally fine pitch 3D electrical interconnect. Like ZiBond, the DBI and DBI Ultra alignment and bonding processes are performed at room temperature. These technologies also leverage industry-standard manufacturing equipment, such as wafer and die bonders, enabling high-throughput, low cost-of-ownership fabrication processes required for high volume market applications. DBI and DBI Ultra can minimize the need for TSVs by allowing interconnection to occur at the bonding surface, thereby improving electrical performance and reducing cost. By incorporating dielectric bonding, DBI and DBI Ultra eliminate the need for under-fill while providing excellent thermal performance, reliability, and hermeticity, and maintaining an ultra-low profile.

Customers

Our semiconductor packaging, interconnect and other related technologies have been licensed to more than 100 companies. These customers include Samsung, SK hynix, UMC, OmniVision and Broadcom, among others.

Research & Development

As demonstrated by our industry-recognized and widely-deployed advanced technologies, we have a long history of developing, licensing and delivering innovative semiconductor packaging and interconnect solutions worldwide. Many of our longstanding innovations have enabled core function and performance gains in a wide range of semiconductor devices and electronics products over the years.

As we have grown, we continue to develop new technologies internally as well as seek to acquire best-in-class technologies from outside sources. Our combination of experienced research and development engineers, our base of technologies, and our constant efforts to innovate new industry-leading solutions, provides a strong foundation for the development and commercialization of new and unique semiconductor packaging and interconnect solutions to meet the industry's ongoing demand for higher performance, higher functionality and lower cost for years to come.

Intellectual Property Portfolio

As of December 31, 2019, our subsidiaries comprising the Semiconductor and IP Licensing segment owned approximately 1,958 United States patents and patent applications, as well as approximately 1,084 foreign patents and patent applications. The last of the issued patents to expire is in 2038.

From time to time, we acquire complementary IP portfolios from other leading companies in the semiconductor industry. Our criteria for patent acquisitions include: the fit with our existing portfolios, the number and jurisdiction of patent assets, the technical and legal strength of the patents, the actual or likely adoption by industry, and the economic value of the inventions. See Part I, Item 1A- *Risk Factors*.

Strategy

We are focused on the development of advanced semiconductor packaging and interconnect technologies to enable the next generation of mobile, consumer, and computing products. Leveraging our extensive design, simulation and prototyping capabilities, we partner with leaders across the semiconductor ecosystem to develop and commercialize our technologies. As an integral component of our commercialization effort, we transfer our technologies to customer-selected manufacturing sites, foundries and OSATs to enable our customers to manufacture semiconductor products in high volume.

Although we are engaged with and have successfully licensed and transferred our technologies to many semiconductor companies, some of the companies that use our patented technologies have nonetheless chosen not to enter into license agreements with us. Consequently, we have, at times, initiated litigation to enforce our IP rights. We view litigation as an instrument of last resort and we use it only when our efforts to reach negotiated licenses have stalled or failed. If we are unable to secure license agreements on favorable terms through negotiations, or if licensees do not comply with the terms of their licenses, we might have to file new litigation to enforce our rights. See Part 1, Item 3-*Legal Proceedings*.

Competition

We compete primarily with internal technology development groups at semiconductor manufacturers, foundries, assemblers, and electronic component and system manufacturers, who may create their own solutions that compete with technologies that we license. In general, there may be several ways to solve a particular technical problem and there can be no assurance that our inventions and approaches will be the ones generally adopted by the industry. We also compete with other firms in acquiring patent portfolios. The most significant impediments to our semiconductor and IP licensing business are (1) the time it takes for new technologies to be adopted in high volume production, and (2) the tendency for companies to use our inventions and intellectual property without first obtaining a license from us.

Customer Concentration

Nearly all of our revenue is denominated in U.S. dollars. The following table sets forth revenue generated from customers comprising 10% or more of total revenue for the periods indicated:

	Years Ended December 31,		
	2019	**2018**	**2017**
SK hynix Inc.	17%	12%	*
Intel Corporation	11%	*	*
Samsung Electronics, Co. Ltd.	*	38%	*
Micron Technology, Inc.	*	*	11%
Amkor Technologies, Inc.	*	*	10%

* denotes less than 10% of total revenue.

Available Information

Our Internet address is www.xperi.com where we make available, free of charge, our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. Our SEC reports can be accessed through the investor relations section of our website. The information found on our website is not incorporated into this or any other report we file with or furnish to the SEC.

Item 1A. Risk Factors

Our operations and financial results are subject to various risks and uncertainties, including those described below, that could adversely affect our business, financial condition, results of operations, cash flows, and the trading price of our common stock.

Risks Relating to the Mergers

As described in Item 1, Part 1 Business, on December 18, 2019, Xperi and TiVo agreed, subject to the terms and conditions of the Merger Agreement, to effect a strategic combination of our respective businesses by: (i) forming XRAY-TWOLF HoldCo Corporation, a corporation, organized under the laws of the State of Delaware and jointly owned by Xperi and TiVo (“HoldCo”), (ii) Xperi merging with a newly formed, wholly owned direct subsidiary of HoldCo, with Xperi surviving such merger as a direct wholly owned subsidiary of HoldCo (the “Xperi Merger”), and (iii) TiVo merging with a newly formed, wholly owned direct subsidiary of HoldCo, with TiVo surviving such merger as a direct, wholly owned subsidiary of HoldCo (the “TiVo Merger” and together with the Xperi Merger, the “Mergers”).

The risk factors below should be read in conjunction with the risk factors related to the company’s operations set forth below and other information contained in this report. HoldCo will file a registration statement on Form S-4 with the SEC that will include a joint proxy statement/prospectus relating to the Mergers. We urge you to read the registration statement on Form S-4 because it will contain important information about the Mergers, including relevant risk factors.

We may not be able to consummate our merger with TiVo, the consummation of such transaction may be delayed, or the parties may elect to terminate the merger agreement, which may disable or delay the business plans relating to the Mergers.

The consummation of the Mergers is subject to the satisfaction of a number of customary closing conditions, including (i) the adoption of the Merger Agreement by the stockholders of each of Xperi and TiVo; (ii) the absence of governmental restraints or prohibitions preventing the consummation of the Mergers; (iii) subject to certain materiality exceptions, the accuracy of certain representations and warranties of each of Xperi and TiVo contained in the Merger Agreement and the compliance by each party with the covenants contained in the Merger Agreement; (iv) the receipt of certain opinions from legal counsel regarding the intended tax treatment of the Mergers; and (v) the absence of a material adverse effect with respect to each of Xperi and TiVo. We or TiVo may not be able to obtain such stockholder approval or satisfy such other conditions, in which case the consummation of the Mergers may be delayed or terminated. Moreover, the board of directors of either company may change its recommendation that stockholders approve the transaction, and the agreement may be terminated in certain circumstances if a competing offer for an alternative transaction is made, in which case the transaction would not close and termination fees may be payable. Upon termination of the merger agreement under certain circumstances, we may be obligated to pay TiVo a termination fee of $44,000,000. Additionally, under specified circumstances, we or TiVo may be required to pay an expense reimbursement amount of $10,000,000. If the Mergers are not consummated or are materially delayed for these or any other reason, the execution of the announced business plans for the Mergers, including the goal to create a unique entertainment platform for the discovery, delivery, and monetization of content, as well as an intellectual property licensing platform that spans a number of the largest addressable markets in entertainment content, consumer electronics, and semiconductors, would be disabled or delayed. In such event, our business and operations, and our stock price, may be adversely affected.

There can be no assurance that the expected benefits of the Mergers will occur or be fully or timely realized.

The success of the Mergers will depend, in part, on the combined company's ability to successfully combine our business with the business of TiVo. The combination of two independent businesses is a complex, costly and time consuming process, and the management of the combined company may face significant challenges in implementing such integration, including, without limitation:

- difficulties integrating TiVo's product technologies with our product technologies in a manner that creates technical synergies or that yields new or improved product applications in targeted markets;
- failure to timely realize the projected cost savings or operating synergies as a result of the Mergers;
- costs and strain on resources arising from attempts at integrating the businesses;
- difficulties integrating the operations and personnel of the two companies into unified operations, organization, and human resources programs, and the risk that key employees could be lost;
- failure to accurately forecast and communicate the long-term value or profitability of either business, including as a result of any failure to implement the business strategy for the Mergers;
- adverse pricing trends or inability to achieve economies of scale as a result of the Mergers;
- failure to maintain relationships with existing customers of the two companies, including customers who may be unfamiliar with Xperi or see themselves as being in conflict with the Xperi intellectual property business;
- failure of the market to adopt new products or technologies developed as a result of the integration of Xperi's and TiVo's businesses; and
- inability to manage growth resulting from the Mergers, including a failure to improve and expand management, systems, financial controls, a failure to expand, train and manage the combined employee base, or a failure to meet demand and quality standards required by Xperi's and TiVo's existing and potential customers and licensees.

Some of these factors will be outside of the control of management and any one of them could result in increased costs and diversion of management's time and energy, as well as decreases in the amount of expected revenues which could materially impact the company's business, financial conditions and results of operations. If the combined company is not able to adequately address integration challenges, the combined company may be unable to integrate successfully our and TiVo's operations or to realize the anticipated benefits of the transactions. In addition, the actual integration may result in additional and unforeseen expenses, and the anticipated benefits of the integration plan may not be realized. Actual growth and cost savings, if achieved, may be lower and may take longer to achieve than anticipated.

We will be subject to business uncertainties and contractual restrictions until the Mergers are consummated.

Uncertainty about the effect of the Mergers on employees, suppliers, customers, distributors, licensors and licensees as well as licenses, contracts and other agreements, particularly for which the Mergers could be deemed a "change-in-control" under the applicable terms and conditions may have an adverse effect on Xperi, TiVo, and consequently the combined company. Changes to existing business relationships, including termination or modification, could negatively affect Xperi and/or TiVo's revenues, earnings and cash flow, as well as the market price of Xperi Common Stock. These uncertainties may impair each party's ability to attract, retain and motivate key personnel until the consummation of the Mergers, and could cause suppliers, customers and others that deal with the parties to seek to change existing business relationships with them. Retention of employees could be challenging during the pendency of the Mergers due to uncertainty about their future roles. If key employees depart because of issues related to the uncertainty and difficulty of integration or a desire not to remain with the businesses, the combined company's business following the consummation of the Mergers could be negatively impacted. Further, no assurance can be given that the combined company will be able to attract or retain key management personnel and other key employees of Xperi and TiVo to the same extent that Xperi and TiVo have previously been able to attract or retain their employees.

We expect to incur substantial transaction-related costs in connection with the Mergers.

We expect to incur significant costs, expenses, and fees for professional services and other transaction costs in connection with the transaction. The substantial majority of these costs will be non-recurring expenses relating to the Mergers, including costs relating to integration. These costs could adversely affect our financial condition and results of operations prior to the Mergers and of the combined company following the Mergers.

The Mergers could expose the combined company to liabilities and claims that we or TiVo have not previously experienced.

Upon closing of the Mergers, our combination with TiVo could increase the risk that the combined company becomes subject to claims of infringement of third-party intellectual property rights. We do not have prior experience in content aggregation and discovery technologies in which third parties may hold a substantial body of patents and other intellectual property rights. Moreover, the risks of third-party infringement claims could be heightened by the combined company's need to engage in enforcement activities with respect to Xperi's existing patents, as Xperi's existing or potential licensees may seek to assert infringement claims against the TiVo business in response to enforcement activities relating to Xperi's existing patents. Competitors of TiVo would not be subject to such heightened risk of third-party claims, and such claims could adversely affect the combined company's business as well as impair its enforcement ability and licensing revenues.

The Mergers may not help to rationalize Xperi's and TiVo's disparate business operations. The combined company may dispose of or discontinue product lines, technologies, assets or operations, whether existing or acquired, if they do not fit into the strategic vision or meet forecasted results. Moreover, the potential separation of the combined companies' product and licensing businesses may not be achieved.

We believe that TiVo's business includes operations that are complementary to both our audio and imaging product and licensing operations and our semiconductor packaging, interconnect, and other patent licensing activities. However, future efforts by the combined company to rationalize Xperi's and TiVo's disparate business operations could result in the combined company's management to refocus on certain business operations while disinvesting in others. We intend to integrate each company's respective product and licensing businesses and operate them as separate product and licensing business units in order to facilitate a potential separation of these units at a later date. Additionally, as business strategy and product markets continue to evolve, the combined company may dispose, discontinue, or divest product lines or business divisions. Disposing or discontinuing existing product lines or business divisions, or separating business units, provides no assurance that operating expenses will be reduced or will not cause the combined company to incur material charges associated with such decision. Furthermore, the disposition or discontinuance of an existing product line or business division, or separation or spinoff of a business unit, entails various risks, including the risk of not being able to obtain a purchaser, or, if obtained, the purchase price may not be equal to at least the net asset book value for the product line or business unit, or the value that investors place on it as reflected in Xperi's stock price or the stock price of the combined company. The combined company may not be able to achieve any separation of the combined companies' product and licensing businesses despite our current consideration of such a separation. Other risks of such actions include adversely affecting employee morale, managing the expectations of, and maintaining good relations with, customers of disposed or discontinued product lines or business divisions, which could prevent selling other products to them. The combined company may also incur other significant liabilities and costs associated with disposal or discontinuance of product lines or business divisions, or separation of business units, including employee severance costs, relocation expenses, and impairment of lease obligations and long-lived assets. The effects of such actions may adversely impact business operations and the financial condition of the combined company.

Litigation challenging the Merger Agreement may prevent the Mergers from being consummated at all or within the expected timeframe.

We anticipate that a putative class action lawsuit may be filed against us and TiVo, challenging our merger with TiVo. If such lawsuit is filed, we anticipate that it will seek, among other things, to enjoin consummation of the Mergers. One of the conditions to the consummation of the Mergers is the absence of any injunctions prohibiting or restraining the Mergers. If any plaintiff is successful in its efforts, then the combination of our business with TiVo may not be consummated at all or within the expected timeframe.

Risks Relating to Our Business

Our revenue and billings have been concentrated and we anticipate that our revenue and billings will continue to be concentrated in a limited number of customers. If we lose any of these customers, or these customers do not pay us, our revenue and billings could decrease substantially.

We have earned a significant amount of our revenue from a limited number of customers. For the year ended December 31, 2019, there were two customers that accounted for 10% or more of total revenue. For the year ended December 31, 2019, there were two customers that accounted for 10% or more of total billings. We expect that a significant portion of our billings and revenue will continue to come from a limited number of customers for the foreseeable future. If we lose any of these customers, or these customers do not pay us, our billings and revenue could decrease substantially. In addition, historically a significant portion of our recurring billings were the result of structured payment terms in connection with the settlement of litigation matters. If we are unable to replace the billings from an expiring license or at the end of structured payment terms of a settlement agreement with similar billings from other customers, our revenue and billings could be adversely impacted as compared to periods prior to such expiration or the end of such payment terms.

We enter into license agreements that have fixed expiration dates and if, upon expiration or termination, we are unable to renew or replace such license agreements on terms favorable to us, our results of operations could be harmed.

We enter into license agreements that have fixed expiration dates. Upon expiration of such agreements we need to renew or replace these agreements in order to maintain our royalty base. If we are unable to replace the royalties from an expiring license, either through a renewal or with similar royalties from other customers, our results of operations could be adversely impacted as compared to periods prior to such expiration.

Furthermore, we may not be able to continue licensing customers on terms favorable to us, under the existing terms or at all, which would harm our results of operations. While we have expanded our licensable technology portfolio through internal development and patents purchased from third parties, there is no guarantee that these measures will lead to continued royalties. If we fail to continue to do business with our current licensees, our business would be materially adversely affected.

The success of our patent licensing business is dependent on the quality of our patent assets and our ability to create and implement new technologies or expand our licensable technology through acquisitions.

We derive a significant portion of our billings from patent licenses and royalties, including structured settlement payments. The success of our patent licensing business depends on our ability to continue to develop and acquire high quality patents. We devote significant resources to developing new technologies and to sourcing and acquiring patents to address the evolving needs of the semiconductor and the consumer and communication electronics industries, and we must continue to do so in the future to remain competitive. Developments in our technologies are inherently complex and require long development cycles and a substantial investment before we can determine their commercial viability. Moreover, competition for acquiring high quality patents is intense and there is no assurance that we can continue to acquire such patents on favorable terms. We may not be able to develop and market new or improved technologies, or to develop or acquire high quality patents, in a timely or commercially acceptable fashion. Furthermore, our acquired and developed patents will expire in the future. Our current U.S. issued patents expire at various times through 2038. We need to develop or acquire successful innovations and obtain royalty-generating patents on those innovations before our current patents expire, and our failure to do so would significantly harm our business, financial position, results of operations and cash flows.

Our use of cash and substantial long-term borrowing to finance the DTS acquisition, and the refinancing of our indebtedness and that of TiVo's in connection with the Mergers, could limit future opportunities for our business, and could materially adversely affect our financial condition if we are unable to pay principal or interest on, or to refinance, such indebtedness.

The DTS acquisition was financed with existing cash balances and a $600 million secured term loan, with $344 million remaining outstanding under the loan as of December 31, 2019. We have obtained a bank commitment letter for an aggregate principal amount of $1,100 million in debt financing in order to pay transaction expenses in connection with the planned merger with TiVo and to refinance the existing indebtedness of the Company and TiVo. As a result, our debt balance will increase substantially following the Mergers. The incurrence of this substantial long-term debt could limit our ability to make future acquisitions, investments and capital expenditures that may be necessary or desirable for the operation or expansion of our business. Moreover, our ability to service the principal and interest payments on such indebtedness will depend on our continuing ability to generate requisite cash flow from our existing and acquired business operations. The terms of our existing indebtedness include, and the terms of the refinancing will include, covenants that may limit our operating flexibility and create a risk of default if we are unable to meet financial ratios and other covenant requirements. While we made voluntary prepayments of $100 and $150 million of principal on our existing indebtedness in 2018 and 2019, respectively, we may be unable to generate sufficient cash flow to make principal and interest payments on this debt or on the refinanced debt in future periods, and in any event, we may be required to refinance the remaining indebtedness upon its maturity. We may be unable to refinance such indebtedness on favorable terms or at all. For example, a downgrade in our credit rating could make any such refinancing more difficult to secure on favorable terms. A default under, or inability to refinance, our indebtedness could substantially adversely affect our continuing financial viability, and could lead to insolvency, bankruptcy, and the reduction or elimination of stockholders' equity.

Our variable rate indebtedness may expose us to interest rate risk, which could cause our debt costs to increase significantly.

As of December 31, 2019, we had $344.0 million of outstanding indebtedness that was subject to floating interest rates. Changes in economic conditions outside of our control could result in higher interest rates, thereby increasing our interest expense and reducing the funds available for capital investment, operations or other purposes. At December 31, 2019, a 1% increase in the effective interest rate on our outstanding debt throughout a one-year period would result in an annual increase in our interest expense of approximately $3.4 million. Any significant increase in our interest expense could negatively impact our results of operations and cash flows and also our ability to pay dividends in the future. If the U.S. Federal Reserve raises its benchmark interest rate, any increases would likely impact the borrowing rate on our outstanding indebtedness, and increase our interest expense, comparably.

We are or may become involved in litigation and administrative proceedings involving some of our patents; any adverse decisions, findings of non-infringement, or invalidation or limitation of the scope of our patents could significantly harm our business.

We are currently involved in litigation involving some of our patents, and may be involved in other such actions in the future. The parties in these legal actions often challenge the infringement, validity, scope, enforceability and/or ownership of our patents. In addition, in the past requests for reexamination or review have been filed in the U.S. Patent and Trademark Office ("PTO") with respect to patent claims at issue in one or more of our litigation proceedings, and oppositions have been filed against us with respect to our patents in the European Patent Office ("EPO"). During a reexamination or review proceeding and upon completion of the proceeding, the PTO or EPO may leave a patent in its present form, narrow the scope of the patent, or cancel or find unpatentable some or all of the claims of the patent. For example, the PTO has issued several Official Actions rejecting or maintaining earlier rejections of many of the claims in some of our patents. From time to time we assert these patents and patent claims in litigation and administrative proceedings. If the PTO's adverse rulings are upheld on appeal and some or all of the claims of the patents that are subject to reexamination are canceled, our business may be significantly harmed. In addition, counterparties to our litigation and administrative proceedings may seek and obtain orders to stay these proceedings based on rejections of claims in PTO reexaminations or review proceedings, and other courts or tribunals reviewing our legal actions could make findings adverse to our interests, even if the PTO actions are not final.

We cannot predict the outcome of any of these proceedings or the myriad procedural and substantive motions in these proceedings. If there is an adverse ruling in any legal or administrative proceeding relating to the infringement, validity, enforceability or ownership of any of our patents, or if a court or an administrative body such as the PTO limits the scope of the claims of any of our patents or concludes that they are unpatentable, we could be prevented from enforcing or earning future royalties from those patents, and the likelihood that customers will take new licenses and that current licensees will continue to agree to pay under their existing licenses could be significantly reduced. The resulting reduction in license fees and royalties could significantly harm our business, consolidated financial position, results of operations and cash flows, as well as the trading price of our common stock.

Regardless of the merits of any claim, the continued maintenance of these legal and administrative proceedings may result in substantial legal expenses and diverts our management's time and attention away from our other business operations, which could significantly harm our business. Our enforcement proceedings have historically been protracted and complex. The time to resolution and complexity of our litigation, its disproportionate importance to our business compared to other companies, the propensity for delay in civil litigation, and the potential that we may lose particular motions as well as the overall litigation could all cause significant volatility in our stock price and have a material adverse effect on our business and consolidated financial position, results of operations, and cash flows.

The timing of billings under our license and settlement agreements may cause fluctuations in our quarterly or annual financial results.

From time to time we enter into license and settlement agreements that include pricing or payment terms that result in quarter-to-quarter or year-over-year fluctuations in our billings and cash flows. The effect of these terms may also cause our aggregate annual billings to grow less rapidly than annual growth in overall unit shipments in the applicable end market. Additionally, our customers may fail to pay, delay payment of or underpay what they owe to us under our license and settlement agreements, which may in turn require us to enforce our contractual rights through litigation, resulting in payment amounts and timing different than expected based on the terms of our license and settlement agreements. This also may cause our revenue, billings and cash flows to fluctuate on a quarter-to-quarter or year-over-year basis.

We expect to continue to be involved in material legal proceedings to enforce or protect our intellectual property and contract rights, including material litigation with existing licensees or strategic partners, that could harm our business.

From time to time, our efforts to obtain a reasonable royalty through our sales efforts do not result in the prospective customer agreeing to license our patents or our technology. In certain cases, we become involved in litigation to enforce our intellectual property rights, enforce the terms of our license agreements, determine the validity and scope of the proprietary rights of others, and defend against claims of infringement or invalidity. Our current legal actions, as described in Part I, Item 3 - *Legal Proceedings*, are examples of disputes and litigation that impact our business. If we are not able to reach agreement with customers or potential customers we may be involved in similar legal proceedings in the future, including proceedings to ensure proper and full payment of royalties by licensees under the terms of their license agreements.

Existing and any future legal actions may harm our business. For example, legal actions could cause an existing customer or strategic partner to cease making royalty or other payments to us, or to challenge the validity and enforceability of our patents or the scope of our license agreements, and could significantly damage our relationship with such customer or strategic partner and, as a result, prevent the adoption of our technologies and intellectual property by such customer or strategic partner. Litigation could also severely disrupt or shut down the business operations of our customers or strategic partners, which in turn would significantly harm our ongoing relations with them and cause us to lose royalties. Moreover, the timing and results of any of our legal proceedings are not predictable and may vary in any individual proceeding. Further, our product licensing business could be subject to greater risk of claims of infringement of third-party intellectual property rights as a result of our IP licensing business. The risks of third-party infringement claims could be heightened by our need to engage in enforcement activities with respect to our existing patents, as our existing or potential licensees may seek to assert infringement claims against our DTS or other product businesses in response to our enforcement activities relating to our existing patents. Competitors of our product licensing business would not be subject to such heightened risk of third-party claims, and such claims could adversely affect our product licensing business as well as impair our enforcement ability and licensing royalties.

The cost of litigation is typically very high and can be difficult to predict, and such high costs and unpredictability may negatively impact our financial results.

From time to time we identify products that we believe infringe our patents. We seek to license the companies that design, make, use, import, sell, or offer for sale those products, but sometimes those companies are unwilling to enter into a license agreement. In those circumstances, we may elect to enforce our patent rights against those companies and products. Litigation stemming from these or other disputes could harm our relationships with those companies or other licensees, or our ability to gain new customers, who may postpone licensing decisions pending the outcome of the litigation or dispute, or who may, as a result of such litigation, choose not to adopt our technologies. In addition, these legal proceedings could be very expensive and may significantly reduce our profits.

In addition, from time to time our customers with existing license agreements dispute their obligations under such agreements, or we may dispute their reporting of royalties due under such agreements. In the past, customers have threatened to initiate litigation against us regarding our licensing royalty rate practices including our adherence to licensing on fair, reasonable, and non-discriminatory terms and potential antitrust claims.

The costs associated with legal proceedings are typically high, relatively unpredictable, and not completely within our control. These costs may be materially higher than expected, which could adversely affect our operating results and lead to volatility in the price of our common stock. Whether or not determined in our favor or ultimately settled, litigation diverts our managerial, technical, legal and financial resources from our business operations. Furthermore, an adverse decision in any of these legal actions could result in a loss of our proprietary rights, subject us to significant liabilities, require us to seek licenses from others, limit the value of our licensed technology or otherwise negatively impact our stock price or our business and consolidated financial position, results of operations and cash flows.

Even if we prevail in our legal actions, significant contingencies may exist to their settlement and final resolution, including the scope of the liability of each party, our ability to enforce judgments against the parties, the ability and willingness of the parties to make any payments owed or agreed upon, and the dismissal of the legal action by the relevant court, none of which are completely within our control. Parties that may be obligated to pay us royalties or damages, or that may otherwise be subject to a judgment, could become insolvent or decide to alter their business activities or corporate structure, which could affect our ability to collect royalties or damages from, or enforce a judgment against, such parties.

Recent and proposed changes to U.S. patent laws, rules, and regulations may adversely impact our business.

Our business relies in part on the uniform and historically consistent application of U.S. patent laws, rules, and regulations. There have been numerous recent administrative, legislative, and judicial changes and proposed changes to patent laws and rules that may have a significant impact on our ability to protect our technology and enforce our intellectual property rights. For example, there have been and may be bills introduced in the U.S. Congress relating to patent law that could adversely impact our business depending on the scope of any bills that may ultimately be enacted into law. As another example, the U.S. Supreme Court and lower courts have in recent years issued decisions that are not favorable to patent owners. Some of these changes or potential changes may not be advantageous for us and may make it more difficult to obtain adequate patent protection, or to enforce our patents against parties using them without a license or payment of royalties. These changes or potential changes could increase the costs and uncertainties surrounding the prosecution of our patent applications and the enforcement of our patent rights and could have a negative effect on our ability to license our patents and, therefore, on the royalties we can collect.

Some of our license agreements may convert to fully paid-up licenses at the expiration of their terms, or upon certain milestones, and we may not receive royalties after that time.

From time to time we enter into license agreements that automatically convert to fully paid-up licenses upon expiration or upon reaching certain milestones. We may not receive further royalties from customers for any licensed technology under those agreements if they convert to fully paid-up licenses because such customers will be entitled to continue using some, if not all, of the relevant intellectual property or technology under the terms of the license agreements without further payment, even if relevant patents or technologies are still in effect. If we cannot find another source of royalties to replace the royalties from these license agreements converting to fully paid-up licenses, our results of operations following such conversion would be materially adversely affected.

A significant amount of our royalty revenue and billings comes from a few end markets and products, and our business could be harmed if demand for these market segments or products declines.

A significant portion of our royalties comes from the manufacture and sale of packaged semiconductor chips for DRAM, application-specific standard product semiconductors, application-specific integrated circuits, and memory. In addition, we derive substantial royalties from the incorporation of our technology into mobile devices, consumer products and computer hardware. If demand for semiconductors in any one or a combination of these market segments or products declines, our royalties may be reduced significantly and our business would be harmed.

The long-term success of our business is dependent on a royalty-based business model, which is inherently risky.

The long-term success of our business is dependent on future royalties paid to us by customers. Royalty payments under our licenses may be based, among other things, upon the number of electrical connections to the semiconductor chip in a package covered by our licensed technology, a percent of net sales, a rate per package, a per unit sold basis or a fixed quarterly amount. We are dependent upon our ability to structure, negotiate and enforce agreements for the determination and payment of royalties, as well as upon our customers' compliance with their agreements. We face risks inherent in a royalty-based business model, many of which are outside of our control, such as the following:

- the rate of adoption and incorporation of our technology by semiconductor manufacturers, assemblers, foundries, manufacturers of consumer and communication electronics, and the automotive and surveillance industry;
- the willingness and ability of materials and equipment suppliers to produce materials and equipment that support our licensed technology, in a quantity sufficient to enable volume manufacturing;
- the ability of our customers to purchase such materials and equipment on a cost-effective and timely basis;
- the length of the design cycle and the ability of us and our customers to successfully integrate certain of our imaging technologies into their integrated circuits;
- the demand for products incorporating semiconductors that use our licensed technology;
- the cyclicality of supply and demand for products using our licensed technology;
- the impact of economic downturns; and
- the impact of poor financial performance of our customers.

It is difficult for us to verify royalty amounts owed to us under our licensing agreements, and this may cause us to lose revenue and billings.

The terms of our license agreements often require our customers to document their use of our technology and report related data to us on a quarterly basis. Although our license terms generally give us the right to audit books and records of our customers to verify this information, audits can be expensive, time consuming, and may not be cost justified based on our understanding of our customers' businesses, especially given the international nature of our customers. Our license compliance program audits certain customers to review the accuracy of the information contained in their royalty reports in an effort to decrease the likelihood that we will not receive the royalty to which we are entitled under the terms of our license agreements, but we cannot give assurances that such audits will be effective to that end.

The markets for semiconductors and related products are highly concentrated, and we may have limited opportunities to license our technologies or sell our products.

The semiconductor industry is highly concentrated in that a small number of semiconductor designers, foundries, and manufacturers account for a substantial portion of the purchases of semiconductor products generally, including our products and products incorporating our technologies. Continued consolidation in the semiconductor industry may increase this concentration. Accordingly, we expect that licenses of our technologies and sales of our products will be concentrated with a limited number of customers for the foreseeable future. As we develop and acquire new technologies and integrate them into our product line, we will need to establish new relationships to sell these products. Our financial results significantly depend on our success in establishing and maintaining relationships with, and effecting substantial sales to, these customers. Even if we are successful in establishing and maintaining such relationships, our financial results will be dependent in large part on these customers' sales and business results.

We make significant investments in new products and services that may not achieve technological feasibility or profitability or that may limit our growth.

We have made and will continue to make significant investments in research, development, and marketing of new technologies, products and services, including audio, imaging, advanced semiconductor packaging, bonding, and interconnect technologies, as well as a new hardware and software solution for high-performance inference at the edge being developed by a new subsidiary. Investments in new technologies are speculative and technological feasibility may not be achieved. Commercial success depends on many factors including demand for innovative technology, availability of materials and equipment, selling price the market is willing to bear, competition and effective licensing or product sales. We may not achieve significant revenue or billings from new product and service investments for a number of years, if at all. Moreover, new technologies, products and services may not be profitable, and even if they are profitable, operating margins for new products and businesses may not be as high as the margins we have experienced historically or originally anticipated.

Our substantial research and development investments may not translate into product market success, and could be jeopardized by our lack of relevant product experience, competition from other innovators with greater resources, dependence on third-party suppliers, and other factors.

We have incurred, and expect to continue to incur, substantial research and development expenses through a new subsidiary focused on delivering a new machine learning-based hardware and software platform. We do not have prior experience as a company in the development or marketing of a similar hardware or software platform. We will need to continue to find and hire relevant personnel to advance this new business. This new subsidiary may be unable to develop or market products that generate material revenue or that recoup our past and ongoing research and development costs. We will be reliant on third parties for chip design and manufacturing, and we may be unable to obtain sources of supply at a competitive price, or at all. Moreover, the semiconductor industry is highly cyclical, and the specific product markets targeted by the platform may be cyclical as well. The timing of new product introductions from this new subsidiary may not coincide with favorable parts of these cycles, increasing our risk of failure. In addition, chip technologies such as what we are developing are subject to extensive competition and a relentless pace of innovation. These new products could be copied or functionally surpassed by other designers, manufacturers, or innovators, some of whom may have far greater financial resources than the Company, and who may be able to develop products with greater capabilities or lower cost.

We may not be able to evolve our audio and imaging technologies, products, and services, or develop new technologies, products, and services, that are acceptable to our customers or the evolving markets, and our customers may use technologies offered at lower cost by others.

The markets for our audio and imaging technologies, products, and services are characterized by:

- rapid technological change and product obsolescence;
- new and improved product introductions;
- changing consumer demands;
- increasingly competitive product landscape; and
- evolving industry standards.

Our future success in our product licensing business depends upon our ability to enhance our existing technologies, products, and services and to develop enhanced and acceptable new technologies, products, and services on a timely basis. The development of enhanced and new audio and imaging technologies, products, and services is a complex and uncertain process requiring high levels of innovation, highly-skilled engineering and development personnel, and the accurate anticipation of technological and market trends. We may not be able to accurately identify, develop, market, or support new or enhanced technologies, products, or services on a timely basis, if at all. Furthermore, our new imaging and audio technologies, products, and services may never gain market acceptance, and we may not be able to respond effectively to evolving consumer demands, technological changes, product announcements by competitors, or emerging industry standards. Any failure to respond to these changes or concerns would likely prevent our imaging and audio technologies, products, and services from gaining market acceptance or maintaining market share and could lead to our imaging and audio technologies, products, and services becoming obsolete.

Furthermore, the decision by a party dominant in the entertainment value chain to provide audio or imaging technology at very low or no cost could cause our customers and other manufacturers not to utilize our technologies or services in the future. Our customers may choose to use technologies that their own in-house audio or imaging engineering teams have developed, or in which they have an interest. Accordingly, our revenue or billings could decline if our customers choose not to incorporate our audio or imaging technologies in their products, or if they sell fewer products incorporating our audio or imaging technologies.

Competing technologies may harm our business.

We expect that our technologies will continue to compete with technologies of internal design groups at semiconductor manufacturers, assemblers, electronic component, foundries and system manufacturers. The internal design groups of these companies create their own semiconductor, packaging, audio and imaging solutions. If these internal design groups design around our patents or introduce unique solutions superior to our technology, they may not need to license our technology. These groups may design technology that is less expensive to implement or that enables products with higher performance or additional features. Many of these groups have substantially greater resources, greater financial strength and lower cost structures which may allow them to undercut our price. They also have the inherent advantage of access to internal corporate strategies, technology roadmaps and technical information. As a result, they may be able to bring alternative solutions to market more easily and quickly.

DTS audio technologies compete with other providers of audio products and services, with Dolby Laboratories as the primary competitor in high-definition audio processing. Dolby Laboratories enjoys certain competitive advantages in selling its digital multi-channel audio technology, having introduced such technology before we did, and having achieved mandatory standard status in product categories that we have not, including terrestrial digital TV broadcasts in the United States.

For our embedded image processing technologies such as Face Detection and our other products, our offerings compete with other image processing software vendors such as ArcSoft, Inc. as well as internal design groups of mobile phone and digital camera manufacturers providing similar technologies by employing different approaches.

In the future, our licensed technologies may also compete with other technologies that emerge. These other technologies may be less expensive and provide higher performance than our solutions. Companies with these competing technologies may also have greater resources. Technological change could render our technologies obsolete, and new, competitive technologies could emerge that achieve broad adoption and adversely affect the use of our technologies and intellectual property.

If we do not successfully further develop and commercialize the technologies we acquire, or cultivate strategic relationships that expand our licensable portfolio, our competitive position could be harmed and our operating results adversely affected.

We attempt to expand our licensable technology portfolio and technical expertise by further developing and acquiring new technologies or developing strategic relationships with others. These strategic relationships may include the right for us to sublicense technology and intellectual property to others. We may not be able to acquire or obtain rights to licensable technology and intellectual property in a timely manner or upon commercially reasonable terms. Even if we do acquire such rights, some of the technologies we invest in may be commercially unproven and may not be adopted or accepted by the industry. Moreover, our research and development efforts, and acquisitions and strategic relationships, may be futile if we do not accurately predict the future needs of the semiconductor, consumer and communication electronics, and consumer imaging and audio processing industries. Our failure to acquire new technologies that are commercially viable in the semiconductor, consumer and communication electronics, and consumer imaging and audio processing industries could significantly harm our business, financial position, results of operations and cash flows.

The way we integrate internally developed and acquired technologies into our products and licensing programs may not be accepted by customers.

We have devoted, and expect to continue to devote, considerable time and resources to developing, acquiring and integrating new and existing technologies into our products and licensing programs. However, if customers do not accept the way we have integrated our technologies, they may adopt competing solutions. In addition, as we introduce new products or licensing programs, we cannot predict with certainty if and when our customers will transition to those new products or licensing programs. Moreover, with respect to certain of our imaging technologies, even after we have signed a license agreement with a customer, we will often not see significant royalties from that customer until after such technologies have been successfully designed into the customer's integrated circuits, which can take 18 months or longer. If customers fail to accept new or upgraded products or licensing programs incorporating our technologies, our financial position, results of operations and cash flows could be adversely impacted.

If we fail to protect and enforce our intellectual property rights, contract rights, and our confidential information, our business will suffer.

We rely primarily on a combination of license, development and nondisclosure agreements and other contractual provisions, as well as patent, trademark, trade secret and copyright laws, to protect our technology and intellectual property. If we fail to protect our technology, intellectual property, or contract rights, our customers and others may seek to use our technology and intellectual property without the payment of license fees and royalties, which could weaken our competitive position, reduce our operating results and increase the likelihood of costly litigation. The growth of our business depends in large part on our ability to secure intellectual property rights in a timely manner, our ability to convince third parties of the applicability of our intellectual property rights to their products, and our ability to enforce our intellectual property rights.

In certain instances, we attempt to obtain patent protection for portions of our technology, and our license agreements typically include both issued patents and pending patent applications. If we fail to obtain patents in a timely manner or if the patents issued to us do not cover all of the inventions disclosed in our patent applications, others could use portions of our technology and intellectual property without the payment of license fees and royalties. For example, our business may suffer if we are unable to obtain patent protection in a timely manner from the PTO due to processing delays resulting from examiner turnover and a continuing backlog of patent applications.

We also rely on trade secret laws rather than patent laws to protect other portions of our proprietary technology. Trade secrets can be difficult to protect. The misappropriation of our trade secrets or other proprietary information could seriously harm our business. We protect our proprietary technology and processes, in part, through confidentiality agreements with our employees, consultants, suppliers and customers. We cannot be certain that these contracts have not been and will not be breached, that we will be able to timely detect unauthorized use or transfer of our technology and intellectual property, that we will have adequate remedies for any breach, or that our trade secrets will not otherwise become known or be independently discovered by competitors. If we fail to use adequate mechanisms to protect our technology and intellectual property, or if a court fails to enforce our intellectual property rights, our business will suffer. We cannot be certain that these protection mechanisms can be successfully asserted in the future or will not be invalidated or challenged.

Further, the laws and enforcement regimes of certain countries may not protect our technology and intellectual property to the same extent as do the laws and enforcement regimes of the U.S. In certain jurisdictions we may be unable to protect our technology and intellectual property adequately against unauthorized use, which could adversely affect our business.

Our business may suffer if third parties assert that we violate their intellectual property rights.

Third parties may claim that either we or our customers are infringing upon their intellectual property rights. Even if we believe that such claims are without merit, they can be time-consuming and costly to defend against and will divert management’s attention and resources away from our business. Furthermore, third parties making such claims may be able to obtain injunctive or other equitable relief that could block our ability to further develop or commercialize some or all of our products or services in the U.S. and abroad. Claims of intellectual property infringement also might require us to enter into costly settlement or license agreements, pay costly damage awards, or defend or indemnify our customers against judgments, damages, or other losses. Even if we have an agreement that provides for a third party to indemnify us against such costs, the indemnifying party may be unable to perform its contractual obligations under the agreement. If we cannot or do not license the allegedly infringed intellectual property on reasonable terms, or need to substitute similar technology from another source, our business, financial position, results of operations and cash flows could suffer.

Our licensing cycle is lengthy and costly, and our marketing, legal and sales efforts may be unsuccessful.

We generally incur significant marketing, legal and sales expenses prior to entering into our license agreements, generating a license fee and establishing a royalty stream from each licensee. The length of time it takes to establish a new licensing relationship, and/or for our customers to incorporate certain of our technologies in their integrated circuits, can be 18 months or longer. As such, we may incur significant expenses in any particular period before any associated royalty or cash flow stream begins.

Our business incurs significant reverse engineering expenditures on products of potential licensees in order to prepare sales and marketing collateral. We employ intensive marketing and sales efforts to educate licensees, potential licensees and original equipment manufacturers about the benefits of our technologies. In addition, even if these companies adopt our technologies, they must devote significant resources to integrate fully our technologies into their operations. If our marketing and sales efforts are unsuccessful, then we may not be able to achieve widespread acceptance of our technology. In addition, ongoing litigation could impact our ability to gain new licensees which could have an adverse effect on our financial condition, results of operations and cash flows.

If our licensees delay, refuse to or are unable to make payments to us due to financial difficulties or otherwise, or shift their licensed products to other companies to lower their royalties to us, our operating results and cash flows could be adversely affected.

A number of companies in the semiconductor and consumer electronics industries face severe financial difficulties from time to time. As a result, there have been bankruptcies and restructuring of companies in these industries. Customers may face financial difficulties which may result in their inability to make payments to us in a timely manner, or at all. In addition, we have had a history of, and we may in the future experience, customers that delay or refuse to make payments owed to us under license or settlement agreements. Our customers may also merge with or may shift the manufacture of licensed products to companies that are not currently licensees to us. This could make the collection process complex and difficult, which could adversely impact our business, financial condition, results of operations and cash flows.

Failure by the semiconductor industry to adopt our technology for the next generation high performance chips used in consumer electronics would significantly harm our business.

To date, our technology has been used by several companies in high performance semiconductor chips, including DRAM. For example, semiconductor packaging, circuitry and processing using our technology is used for DDR3 and DDR4 DRAM and we currently have customers who are paying royalties for DRAM chips in advanced packages.

We anticipate that royalties from shipments of next-generation semiconductor chips using our technology may account for a significant percentage of our future royalties. If semiconductor manufacturers do not continue to use our technology for the next-generation chips and find viable alternative technologies for use with next-generation chips, or if we do not receive royalties from the next-generation chips that use our technology, our future financial performance and cash flows could be adversely affected.

Our technology may be too expensive for certain next-generation semiconductor manufacturers, which could significantly reduce the adoption rate of our technology in next-generation chips. Even if our technology is selected for at least some of these next-generation chips, there could be delays in the introduction of products utilizing these chips that could materially affect the amount and timing of any royalty payments that we receive. Other factors that could affect adoption of our technology for next-generation semiconductor products include delays or shortages of materials and equipment and the availability of testing services.

Similarly, our audio licensing royalties from consumer electronics product manufacturers depend, in large part, upon the availability of ICs that implement our technologies. IC manufacturers incorporate our audio technologies into these ICs, which are then incorporated into consumer electronics products. We do not manufacture these ICs, but rather depend upon IC manufacturers to develop, produce and then sell them to licensed consumer electronics product manufacturers. We do not control the IC manufacturers' decisions whether or not to incorporate our technologies into their ICs, and we do not control their product development or commercialization efforts. If these IC manufacturers are unable or unwilling to implement our technologies into their ICs, production is delayed, or if they sell fewer ICs incorporating our technologies, our operating results and cash flows could be adversely affected.

The investment of our cash, cash equivalents and investments in marketable debt and equity securities is subject to risks which may cause losses and affect the liquidity of these investments.

At December 31, 2019, we held approximately $74.6 million in cash and cash equivalents and $46.9 million in short-term investments. These investments include various financial securities such as corporate bonds and notes, municipal bonds and notes, commercial paper, treasury and agency notes and bills, and money market funds. Although we invest in high quality securities, ongoing financial events have at times adversely impacted the general credit, liquidity, market and interest rates for these and other types of debt securities. Changes in monetary policy by the Federal Reserve, government fiscal policies, and global economic and market conditions may adversely affect the value of our investment portfolio. While we have historically held our debt investments to maturity, we may in the future have a need to sell investments before their maturity dates, which could result in losses on the sale of those investments. For example, the DTS acquisition resulted in us liquidating a significant portion of our investments. In the third quarter of 2018, we initiated an equity position in Onkyo Corporation, a publicly traded company listed on the JASDAQ market of the Tokyo Stock Exchange. Upon making the investment, we held a 6.3% ownership interest in Onkyo, and as of December 31, 2019, we held an approximately 2.2% ownership interest. As of December 31, 2019, the market value of our remaining equity investment in Onkyo had decreased by approximately $2.3 million since our initial investment. The financial market and monetary risks associated with our investment portfolio have and may in the future have a material adverse effect on our financial condition, results of operations or cash flows.

Our intellectual property business operates in a highly cyclical industry, which is subject to significant downturns.

The semiconductor and electronics industries in which our intellectual property business primarily operates have historically been cyclical and are characterized by wide fluctuations in product supply and demand. From time to time, these industries have experienced significant downturns, often in connection with, or in anticipation of, declining economic conditions, maturing product and technology cycles, and excess inventories. This cyclicality could cause our operating results to decline from one period to the next. Our business depends, in part, upon the volume of production by our customers, which, in turn, depends upon the current and anticipated market demand for semiconductors and products that use semiconductors. Semiconductor manufacturers, foundries, and package assembly companies generally sharply curtail their spending during industry downturns, and historically have lowered their spending more than the decline in their revenue. As a result, our financial results have been, and will continue to be, impacted by the cyclicality of the electronics industry. If we are unable to control our expenses adequately in response to lower royalties from our customers in such downturns, our results of operations and cash flows will be materially and adversely impacted.

If we are unable to maintain a sufficient amount of content released in the DTS audio format, demand for the technologies, products, and services that we offer to consumer electronics product manufacturers may significantly decline, which would adversely impact our business and prospects.

We expect to derive a significant percentage of our billings from the technologies, products, and services that we offer to manufacturers of consumer electronics products. We believe that demand for our audio technologies in growing markets for multi-channel and/or high resolution audio, including TVs, tablets, mobile phones, video game consoles, automobiles, and soundbars, will be based on the amount, quality, and popularity of content (such as movies, TV shows, music, and games) either released in the DTS audio format or capable of being coded and played in the DTS format. In particular, our ability to penetrate the growing markets in the network-connected space depends on the presence of streaming and downloadable content released in the DTS audio format. We generally do not have contracts that require providers of streaming and downloadable content to develop and release such content in a DTS audio format. Accordingly, our billings could decline if these providers elect not to incorporate DTS audio into their content or if they sell less content that incorporates DTS audio.

In addition, we may not be successful in maintaining existing relationships or developing new relationships with other existing or new content providers. As a result, we cannot assure you that a sufficient amount of content will be released in a DTS audio format to ensure that manufacturers continue offering DTS decoders in the consumer electronics products that they sell.

Demand for our HD Radio technology may be insufficient to sustain projected growth.

Demand for and adoption of HD Radio technology may not be sufficient for us to continue to increase the number of customers of our HD Radio system, which include IC manufacturers, manufacturers of broadcast transmission equipment, consumer electronics products manufacturers, component manufacturers, data service providers, manufacturers of specialized and test equipment and radio broadcasters.

Among other things, continuing and increased consumer acceptance of HD Radio technology will depend upon:

- the number of radio stations broadcasting digitally using HD Radio technology;
- the willingness of automobile manufacturers to include HD Radio receivers in their vehicles;
- the willingness of manufacturers to incorporate HD Radio technology into their products;
- the cost and availability of HD Radio enabled products; and
- the marketing and pricing strategies that we employ and that are employed by our customers and retailers.

Demand for HD Radio also may be impacted by declines in the automotive industry which historically has been cyclical and experienced downturns during declining economic conditions.

If demand for HD Radio technology does not continue to increase as expected, we may not be able to increase our DTS royalties as projected.

Our HD Radio technology may not remain competitive if we do not respond to changes in technology, standards and services that affect the radio broadcasting industry.

The radio broadcasting industry is subject to technological change, evolving industry standards, regulatory restrictions and the emergence of other media technologies and services. Our HD Radio technology may not gain market acceptance over these other technologies. Various other audio technologies and services that have been developed and introduced include:

- internet streaming, cable-based audio programming and other digital audio broadcast formats;
- satellite delivered digital audio radio services that offer numerous programming channels;
- other digital radio competitors, such as Digital Radio Mondiale, or DAB; and
- growth in use of portable devices for storage and playback of audio content.

Competition arising from these or other technologies or potential regulatory change may have an adverse effect on the radio broadcasting industry or on our company and our financial condition and results of operations.

If we are unable to further penetrate the streaming and downloadable content delivery markets and adapt our technologies for those markets, our royalties and ability to grow our audio business could be adversely impacted.

Until recently, video and audio content was purchased and consumed primarily via optical disc-based media. The growth of the internet and network-connected device usage, along with the rapid advancement of online and mobile content delivery, has resulted in download and streaming services becoming mainstream with consumers in various parts of the world. We expect the shift away from optical disc-based media to streaming and downloadable content consumption to continue. If we fail to continue to penetrate the streaming and downloadable content delivery market, our audio business could suffer.

The services that provide content from the cloud are not generally governed by international or national standards and are thus free to choose any media format(s) to deliver their products and services. This freedom of choice on the part of online content providers could limit our ability to grow if such content providers do not incorporate our technologies into their services, which could affect demand for our technologies.

Furthermore, our inclusion in mobile and other network-connected devices may be less profitable for us than optical disc players. The online and mobile markets are characterized by intense competition, evolving industry standards and business and distribution models, disruptive software and hardware technology developments, frequent new product and service introductions, short product and service life cycles, and price sensitivity on the part of consumers, all of which may result in downward pressure on pricing. If we are unable to adequately and timely respond to the foregoing, our business and operating results could be adversely affected.

Changes in financial accounting or taxation standards, rules, practices or interpretations may cause adverse unexpected revenue and expense fluctuations which may impact our reported results of operations.

We prepare our consolidated financial statements in accordance with U.S. generally accepted accounting principles (GAAP). These principles are subject to interpretations by the SEC and various accounting bodies. In addition, we are subject to various taxation rules in many jurisdictions. The existing taxation rules are generally complex, frequently changing and subject to interpretation. Changes to taxation rules, changes to financial accounting standards, or any changes to the interpretations of these standards or rules may adversely affect our reported financial results or the way in which we conduct business. Recent accounting pronouncements and their estimated potential impact on our business are addressed in Note 3 - *"Recent Accounting Pronouncements"* in the Notes to Consolidated Financial Statements.

In May 2014, the Financial Accounting Standards Board ("FASB") issued ASU 2014-09, "Revenue from Contracts with Customers" ("ASU 2014-09"), and since May 2014 the FASB has issued amendments to this new guidance, which collectively provide guidance for revenue recognition. ASU 2014-09 became effective for us beginning January 1, 2018 and we adopted the new standard under the modified retrospective approach. Under the new standard, the historical practice of many licensing companies of reporting revenue from per-unit royalty-based agreements one quarter in arrears is no longer accepted and instead companies must now estimate royalty-based revenue. This guidance significantly impacts our revenue recognition. First, we are no longer allowed to follow our past practice of recording per unit license revenue on a quarter lag basis, a practice precipitated by the lack of reliable estimates for such revenue. Estimating per unit royalty revenue prior to receiving the licensee's royalty report requires us to make significant assumptions and judgments and could cause significant fluctuations of royalty revenue on a quarterly basis. Second, we are now required to record all or a significant majority of revenue under our fixed fee and minimum guarantee license agreements when such agreements are effective rather than recording them over time as was our past practice and which generally aligned revenue more closely with the billing cycle and cash flows from such agreements. While the changes in revenue recognition do not impact our cash flows, the impact on our Statement of Operations under the new accounting standard may impact how investors perceive our business which could materially impact the value of our common stock.

On December 22, 2017, the Tax Cuts and Jobs Act ("Tax Act") was signed into law. The Tax Act introduced a broad range of tax reform measures that significantly changed the federal income tax laws. Many provisions in the Tax Act are generally effective in tax years beginning after December 31, 2017. The prospects of supplemental legislation or regulatory processes to address uncertainties that arise because of the Tax Act, or evolving technical interpretations of the tax law, may cause our financial statements to be impacted in the future. We will continue to analyze the effects of the Tax Act as subsequent guidance continues to emerge.

Our future effective tax rate may be affected by such factors as changes in tax laws, changing interpretation and new guidance related to the Tax Act, withholding tax determinations by foreign tax authorities, the impact of accounting for stock-based compensation, the impact of accounting for business combinations, changes in the composition of global earnings, the expiration of statute of limitations, settlements of audits, changes in our domestic and international organization and changes in overall levels of income before tax.

In order to measure our financial performance, we place greater emphasis on billings and operating cash flows rather than revenue and net operating results, and this emphasis may be misunderstood by investors or create a conflict with the financial measures typically used by investors.

The adoption of ASU 2014-09 had a material impact on the timing of revenue recognition in our business. However, it had no impact on customer billings or the cash flow from our contracts with customers. Our management places greater emphasis on billings and operating cash flows rather than revenue and net operating results to evaluate our financial performance. Our financial performance may appear significantly different when measured by operating cash flows rather than net operating results. Because performance bonuses are earned based on billings based metrics, such bonuses may be higher in years with lower net operating results, or lower in years with higher net operating results, which may confuse investors and analysts. Investors and analysts may place greater emphasis on measures of revenue and net operating results in evaluating the Company's financial performance, notwithstanding management's focus on billings and operating cash flows. Differences in perception of the Company's financial performance could materially impact the price and volatility in the price of our common stock.

Our effective tax rate depends on our ability to secure the tax benefits of our international corporate structure, on the application of the tax laws of various jurisdictions and on how we operate our business.

Our international corporate structure and intercompany arrangements, including the manner in which we market, develop, use and license our intellectual property, fund our operations and structure transactions with our international subsidiaries, may result in the increase or reduction of our worldwide effective tax rate. Such international corporate structure and intercompany arrangements are subject to examination by the tax authorities of the jurisdictions in which we operate, including the United States. The application of the tax laws of these jurisdictions to our international business activities is subject to interpretation and depends on our ability to operate our business in a manner consistent with our corporate structure and intercompany arrangements. Moreover, such tax laws are subject to change. Tax authorities may disagree with our intercompany transfer pricing arrangements, including our transfer of intangibles, or determine that the manner in which we operate our business does not achieve the intended tax consequences. Additionally, current and future changes in the tax laws or interpretations may have an adverse effect on our international corporate structure and operations. For example, various levels of government and international organizations, such as the Organization for Economic Co-operation and Development ("OECD") and the European Union ("EU"), increasingly focus on future tax reform and any result from this development may result in changes to long-standing tax principles. Also, changes in the Korean tax law on royalties subject to withholding taxes from our Korean licensees may impact our financial results. The result of an adverse determination of any of the above items could increase our worldwide effective tax rate and harm our financial position and results of operations.

We have in the past recorded, and may in the future record, significant valuation allowances on our deferred tax assets, and the recording and release of such allowances may have a material impact on our results of operations.

The need for a valuation allowance requires an assessment of both positive and negative evidence on a jurisdiction-by-jurisdiction basis when determining whether it is more likely than not that deferred tax assets are recoverable. In making such assessment, significant weight is given to evidence that can be objectively verified. New facts and circumstances, future financial results, and new guidance related to the Tax Act may require us to reevaluate our valuation allowance positions which could potentially affect our effective tax rate.

We continue to monitor the likelihood that we will be able to recover our deferred tax assets, including those for which a valuation allowance is recorded. There can be no assurance that we will generate profits in future periods enabling us to fully realize our deferred tax assets. The timing of recording a valuation allowance or the reversal of such valuation allowance is

subject to objective factors that cannot be readily predicted in advance. Both the establishment of a valuation allowance and the reversal of a previously recorded valuation allowance may have a material impact on our financial results.

The international nature of our business exposes us to financial and regulatory risks that may have a negative impact on our consolidated financial position, results of operations and cash flows, and we may have difficulty protecting our intellectual property in some foreign countries.

We derive a significant portion of our royalties from licensees headquartered outside of the U.S. We also have operations outside of the U.S., including our research and development facilities in Ireland, Romania and the United Kingdom, to design, develop, test or market certain technologies. International operations are subject to a number of risks, including but not limited to the following:

- changes in trade protection laws, policies and measures, and other regulatory requirements affecting trade and investment;
- regulatory requirements and prohibitions that differ between jurisdictions;
- laws and business practices favoring local companies;
- withholding tax obligations on license royalties that we may not be able to offset fully against our U.S. tax obligations, including the further risk that foreign tax authorities may re-characterize license fees or increase tax rates, which could result in increased tax withholdings and penalties;
- security concerns, including crime, political instability, terrorist activity, armed conflict and civil or military unrest;
- differing employment practices, labor issues and business and cultural factors;
- less effective protection of intellectual property than is afforded to us in the U.S. or other developed countries; and
- limited infrastructure and disruptions, such as large-scale outages or interruptions of service from utilities or telecommunications providers.

Our intellectual property is also used in a large number of foreign countries. There are many countries in which we currently have no issued patents. In addition, effective intellectual property enforcement may be unavailable or limited in some foreign countries. It may be difficult for us to protect our intellectual property from misuse or infringement by other companies in these countries. We expect this to become a greater problem for us as our licensees increase their manufacturing and sales in countries which provide less protection for intellectual property. Our inability to enforce our intellectual property rights in some countries may harm our business, financial position, results of operations and cash flows.

Deteriorating trade relations between the United States and China, other trade conflicts and barriers, economic sanctions, and national security protection policies could limit or prevent us from licensing our technology to certain existing or potential customers, or prevent such customers from doing business with us.

The increased trade conflicts between the United States and its major trading partners, evidenced by trade restrictions such as tariffs, taxes, export controls, economic sanctions, and enhanced policies designed to protect national security, could adversely impact our revenue and billings. In particular, we have seen impacts on our business due to the increase in trade conflicts between the United States and China, although to date this impact has not been material. In the future, trade restrictions could limit or prevent us from licensing our technology to existing or potential customers. In May 2019, the United States Department of Commerce designated Huawei Technologies, a current customer of ours, to its “entity list,” which limits the ability of U.S. companies to export products and license technologies to Huawei. These export controls, as well as retaliatory controls and tariffs that China has imposed and is considering, could restrict our ability to do business with Huawei and other Chinese customers. Further United States government actions to protect domestic economic and security interests could lead to further restrictions. Moreover, growing trade conflicts and uncertainties can be expected to lead to decreased use of foreign-owned technologies in China and other countries, due to efforts by foreign governments and enterprises to find alternative sources of supply, to develop proprietary domestic technologies, and otherwise to reduce reliance on foreign technology sources. These trends could have a material adverse impact on our revenue and billings.

Our business may be adversely affected by the recent coronavirus outbreak.

In December 2019, a novel strain of coronavirus was reported to have surfaced in Wuhan, China. In January 2020, this coronavirus spread to other countries, including the United States, and efforts to contain the spread of this coronavirus intensified. At this time, we have temporarily closed our offices in China, Taiwan and Hong Kong and asked our employees to work from home. We continue to monitor our operations and government recommendations, and may in the future elect to keep our facilities in affected areas closed, or otherwise protect our properties. The outbreak and any preventative or protective actions that we may take in respect of this coronavirus may result in a period of business disruption and reduced operations. Our customers’ businesses could be disrupted, and our revenues and billings could be negatively affected. Any resulting

financial impact cannot be reasonably estimated at this time but may materially affect our business, financial condition and results of operations. The extent to which the coronavirus impacts our results will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of the coronavirus and the actions to contain the coronavirus or treat its impact, among others.

Our business and operating results may be harmed if we are unable to manage growth in our business, if we undertake any restructuring activities or if we dispose of a business division or dispose of or discontinue any product lines.

We have in the past expanded our operations, domestically and internationally, and may continue to do so through both internal growth and acquisitions. In December 2019, we announced plans to merge with TiVo, and we currently anticipate this merger being completed in the second quarter of 2020. In December 2016, we acquired DTS, resulting in our headcount more than doubling year over year. If our growth continues, it may place a significant strain on our management team and on our operational and financial systems, procedures, and controls. Our future success will depend, in part, upon the ability of our management team to manage any growth effectively, requiring our management to:

- recruit, hire, and train additional personnel;
- implement and improve our operational and financial systems, procedures, and controls;
- maintain our cost structure at an appropriate level based on the royalties, billings and cash we forecast and generate;
- manage multiple concurrent development projects; and
- manage operations in multiple time zones with different cultures and languages.

If we are unable to effectively manage our growth or we are unsuccessful in recruiting and retaining personnel, our business and operating results will be harmed. Moreover, if our planned merger with TiVo, acquisitions or other growth initiatives do not prove to be profitable, we may undertake to restructure our business, including the disposition of a business division, or the disposition or discontinuance of a product line. Any restructuring, disposition or discontinuance would require substantial management time and attention and may divert management from other important work, and may result in significant liabilities and costs as described earlier.

Disputes regarding our intellectual property may require us to defend or indemnify certain customers or licensees, the cost of which could adversely affect our business operations and financial condition.

While we generally do not defend or indemnify our customers, some of our license agreements in our imaging and audio businesses provide limited defense and indemnities for certain actions brought by third parties against our customers, and some require us to provide technical support and information to a customer that is involved in litigation for using our technology. Our defense, indemnity and support obligations could result in substantial expenses. In addition to the time and expense required for us to defend, indemnify or supply such support to our customers, a customer’s development, marketing and sales of licensed image or audio products could be severely disrupted or shut down as a result of litigation, which in turn could have a material adverse effect on our business operations, consolidated financial position, results of operations and cash flows.

If we lose any of our key personnel or are unable to attract, train and retain qualified personnel, we may not be able to execute our business strategy effectively.

Our success depends, in large part, on the continued contributions of our key management, engineering, sales, marketing, intellectual property, legal and finance personnel, many of whom are highly skilled and would be difficult to replace. None of our senior management, key technical personnel or key sales personnel are bound by written employment contracts to remain with us for a specified period. In addition, we do not currently maintain key-person life insurance covering our key personnel or have restrictions on their post-employment ability to solicit our employees, contractors or customers if key personnel voluntarily terminate their employment. The loss of any of our senior management or other key personnel could harm our ability to implement our business strategy and respond to the rapidly changing market conditions in which we operate. Our future success will depend to a significant extent on the ability of these executives to effectively drive execution of our business strategy, and on the ability of our management team to work together effectively.

Our success also depends on our ability to attract, train and retain highly skilled managerial, engineering, sales, marketing, legal and finance personnel and on the abilities of new personnel to function effectively, both individually and as a group. Competition for qualified senior employees can be intense. We have also experienced difficulty in hiring and retaining highly skilled engineers with appropriate qualifications to support our growth and expansion. Further, we must train our new personnel, especially our technical support personnel, to respond to and support our licensees and customers. If we fail to do this, it could lead to dissatisfaction among our licensees or customers, which could slow our growth or result in a loss of business.

Our business operations could suffer in the event of information technology system failures or security breaches.

Despite system redundancy and the implementation of security measures within our internal and external information technology and networking systems, our information technology systems may be subject to security breaches, unauthorized access (malicious or accidental), misuse of information by authorized users, data leaks or unintentional exposure of information, failed process, loss of data, damages from computer viruses or malware, natural disasters, terrorism, telecommunication failures or disruption of service. Any system failure or security breach could cause interruptions in our operations in addition to the possibility of losing proprietary information and trade secrets. To the extent that any disruption or security breach results in inappropriate disclosure of our confidential information, we may incur liability or additional costs to remedy the damages caused by these disruptions or security breaches.

Decreased effectiveness of share-based compensation could adversely affect our ability to attract and retain employees.

We have historically used stock options, restricted stock grants and other forms of stock-based compensation as key components of employee compensation in order to align employees' interests with the interests of our stockholders, encourage employee retention and provide competitive compensation and benefit packages. We incur significant compensation costs associated with our stock-based compensation programs. Failure to obtain stockholder approval of equity compensation plans or changes to the plans could make it harder or more expensive for us to grant stock-based compensation to employees in the future. As a result, we may find it difficult to attract, retain and motivate employees, and any such difficulty could have a materially adverse impact on our business.

Failure to comply with environmental regulations could harm our business.

We use hazardous substances in the manufacturing and testing of prototype products and in the development of technologies in our research and development laboratories. We are subject to a variety of local, state and federal regulations relating to the storage, discharge, handling, emission, generation, manufacture and disposal of toxic or other hazardous substances. Our past, present or future failure to comply with environmental regulations could result in the imposition of substantial fines, suspension of production, and alteration of our manufacturing processes or cessation of operations. Compliance with such regulations could require us to acquire expensive remediation equipment or to incur other substantial expenses. Any failure to control the use, disposal, removal or storage of, or to adequately restrict the discharge of, or assist in the cleanup of, hazardous or toxic substances, could subject us to significant liabilities, including joint and several liabilities under certain statutes. The imposition of such liabilities could significantly harm our business, financial position, results of operations and cash flows.

We have business operations located in places that are subject to natural disasters.

Our business operations depend on our ability to maintain and protect our facilities, computer systems and personnel. Our corporate headquarters are located in the San Francisco Bay Area and we have engineering activities in several locations throughout California, which in the past have experienced severe earthquakes. We do not carry earthquake insurance for any of our facilities except for our office in Calabasas, California. Earthquakes or other natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects.

We have made and may continue to make or to pursue acquisitions and other business combinations which could divert management's attention, cause ownership dilution to our stockholders, or be difficult to integrate, which may adversely affect our financial results.

We have made several acquisitions, and it is our current plan to continue to acquire assets, patents, technologies or companies that we believe are strategic to our future business. For example, in December 2019 we announced the planned merger with TiVo, and we currently expect that merger to be completed in the second quarter of 2020. In the fourth quarter of 2016, we acquired DTS, Inc., for approximately $955 million. Investigating businesses, assets, patents or technologies and integrating newly acquired or merged businesses, assets, patents or technologies could put a strain on our resources, could be costly and time consuming, and might not be successful. Such activities divert our management's attention from other business concerns. In addition, we might lose key employees while integrating new organizations or operations. Mergers and acquisitions could also result in customer dissatisfaction, performance problems with an acquired or merged company or technology, potentially dilutive issuances of equity securities or the incurrence of debt, the assumption or incurrence of contingent liabilities, impairment charges related to goodwill and possible impairment charges related to other intangible assets or other unanticipated events or circumstances, any of which could harm our business.

Our plans to integrate and expand upon research and development programs and technologies obtained through acquisitions or mergers may result in products or technologies that are not adopted by the market. The market may adopt competitive solutions to our products or technologies. Consequently, we might not be successful in integrating any acquired or merged businesses, assets, products or technologies, and might not achieve anticipated revenue and cost benefits.

There are numerous risks associated with our acquisitions or mergers of businesses, technologies and patents.

We have made a number of acquisitions of businesses, technologies and patents in recent years, and expect to complete the planned merger with TiVo in the second quarter of 2020. These acquisitions and the planned merger are subject to a number of risks, including but not limited to the following:

- these transactions could fail to produce anticipated benefits or could have other adverse effects that we currently do not foresee. As a result, these transactions could result in a reduction of net income per share as compared to the net income per share we would have achieved if these transactions had not occurred. We may also be required to recognize impairment charges of acquired assets or goodwill, and if we decide to restructure acquired or merged businesses, we may incur other restructuring charges;
- the purchase price for each transaction is determined based on significant judgment on factors such as projected cash flow, quality and availability of the business, technology or patent. In addition, if other companies have similar interests in the same business, technology or patent, our ability to negotiate these transactions at favorable terms may be limited and the transaction price may be artificially inflated;
- following completion of these transactions, we may uncover additional liabilities, patent validity, infringement or enforcement issues or unforeseen expenses not discovered during our diligence process;
- any such additional liabilities, patent validity, infringement or enforcement issues or expenses could result in significant unanticipated costs not originally estimated, such as impairment charges of acquired assets and goodwill, and may harm our financial results;
- the integration of technologies, patent assets and personnel, if any, will be a time consuming and expensive process that may disrupt our operations if it is not completed in a timely and efficient manner. If our integration efforts are not successful, our results of operations could be harmed, employee morale could decline, key employees could leave, and customer relations could be damaged. In addition, we may not achieve anticipated synergies or other benefits from any of these transactions;
- we have incurred substantial direct transaction and integration costs as a result of past transactions, and we expect to incur substantial costs as a result of the planned merger with TiVo. In future acquisitions, the total direct transaction costs and the costs of integration may exceed our expectations;
- sales by the acquired and merged businesses may be subject to different accounting treatment than our existing businesses, especially related to the recognition of revenue. This may lead to the loss or deferral of revenue under current and emerging accounting standards, or confusion by investors and analysts based on the differences in revenue recognition in different parts of our business;
- there may be a significant time lag between acquiring patent assets and recognizing royalties from those patent assets. During that time lag, material costs are likely to be incurred in preparing licensing or litigation efforts and amortization of acquired patent assets that would have a negative effect on our results of operations, cash flows and financial position;
- we may require external financing that is dilutive or presents risks of debt; and
- we are required to estimate and record fair values of contingent assets, liabilities, deferred tax assets and liabilities at the time of a transaction. Even though these estimates are based on management's best judgment, the actual results may differ. Under the current accounting guidance, differences between actual results and management's estimates could cause our operating results to fluctuate or could adversely affect our results of operations.

If our amortizable intangible assets (such as acquired patents) become impaired, we may be required to record a significant charge to earnings.

In addition to internal development, we intend to broaden our intellectual property portfolio through strategic relationships and transactions such as the acquisitions of DTS, Inc. in the fourth quarter of 2016 and the planned merger with TiVo that we expect to close in the second quarter of 2020. We believe these strategic relationships and transactions will enhance the competitiveness and size of our current businesses and provide diversification into markets and technologies that complement our current businesses. Future transactions could be in the form of asset purchases, equity investments, or business combinations. As a result, we may have intangible assets which are amortized over their estimated useful lives. We review our amortizable intangible assets (such as our patent portfolio) for impairment when events or changes in circumstances indicate the carrying value may not be recoverable or the useful life is shorter than originally estimated. Factors that may be considered a change in circumstances indicating that the carrying value of our amortizable or other intangible assets may not be recoverable include a decline in future cash flows, fluctuations in market capitalization, slower growth rates in our industry or

slower than anticipated adoption of our products by our customers. As we continue to review for factors that may affect our business which may not be in our control, we may be required to record a significant charge to earnings in our financial statements during the period in which any impairment of our amortizable intangible assets or equity investments is determined, resulting in an adverse impact on our business, financial position, or results of operations.

Current and future governmental and industry standards may significantly limit our business opportunities.

Technology standards are important in the audio and video industry as they help to assure compatibility across a system or series of products. Generally, standards adoption occurs on either a mandatory basis, requiring a particular technology to be available in a particular product or medium, or an optional basis, meaning that a particular technology may be, but is not required to be, utilized. If standards are re-examined or a new standard is developed in which we are not included, our growth in that area of our business could be significantly lower than expected.

As new technologies and entertainment media emerge, new standards relating to these technologies or media may develop. New standards may also emerge in existing markets that are currently characterized by competing formats, such as the market for PCs. We may not be successful in our efforts to include our technology in any such standards.

Changes in or failure to comply with FCC requirements could adversely impact our HD Radio revenue and royalties.

In October 2002, the Federal Communications Commission, or the FCC, selected our "In-Band, On-Channel" ("IBOC") technology, also known as "HD Radio technology," as the exclusive technology for introduction of terrestrial digital operations by AM and FM radio stations. In the United States, the FCC regulates the broadcast radio industry, interprets laws enacted by Congress and establishes and enforces regulations governing radio broadcasting. It is unclear what rules and regulations the FCC may adopt regarding digital audio broadcasting and what effect, if any, such rules and regulations will have on our Product Licensing segment, the operations of stations using our HD Radio technology or consumer electronics manufacturers. Any additional rules and regulations imposed on digital audio broadcasting could adversely impact the attractiveness of HD Radio technology and negatively impact our business. Also, non-compliance by us, or by radio stations offering HD Radio broadcasts, with any FCC requirements or conditions could result in fines, additional license conditions, license revocation or other detrimental FCC actions.

Our licensing of industry standard technologies can be subject to limitations that could adversely affect our business and prospects.

When a standards-setting body adopts our technologies as explicit industry standards, we generally must agree to license such technologies on a fair, reasonable and non-discriminatory basis, which we believe means that we treat similarly situated customers similarly. In these situations, we may be required to limit the royalty rates we charge for these technologies, which could adversely affect our business. Furthermore, we may have limited control over whom we license such technologies to and may be unable to restrict many terms of the license. From time to time, we may be subject to claims that our licenses of our industry standard technologies may not conform to the requirements of the standards-setting body. Claimants in such cases could seek to restrict or change our licensing practices or our ability to license our technologies in ways that could harm our reputation and otherwise materially and adversely affect our business, operating results and prospects.

Our financial and operating results may vary, which may cause the price of our common stock to decline.

Our quarterly operating results have fluctuated in the past and are likely to do so in the future. Because our operating results are difficult to predict, one should not rely on quarterly or annual comparisons of our results of operations as an indication of our future performance. Factors that could cause our operating results to fluctuate during any period or that could adversely affect our ability to achieve our strategic objectives include those listed in this "*Risk Factors*" section of this report and the following:

- the timing of, and compliance with license or service agreements and the terms and conditions for payment to us of license or service fees under these agreements;
- fluctuations in our royalties caused by the pricing terms of certain of our license agreements;
- the amount of our product and service revenue;
- changes in the level of our operating expenses;
- the substantial research and development expenses that we have made and will continue to make on new products, as well as the uncertainty that such products will generate material revenue for the Company;
- delays in our introduction of new technologies or market acceptance of these new technologies through new license agreements;

- our ability to protect or enforce our intellectual property rights or the terms of our agreements;
- legal proceedings affecting our patents, patent applications or license agreements;
- the timing of the introduction by others of competing technologies;
- changes in demand for semiconductor chips in the specific end markets in which we concentrate;
- changes in demand for camera-enabled devices including cell phones, security systems and personal computers;
- the timing of the conclusion of license agreements;
- the length of time it takes to establish new licensing arrangements;
- meeting the requirements for revenue recognition under generally accepted accounting principles;
- changes in generally accepted accounting principles including new accounting standards which may materially affect our revenue recognition and the comparability between revenue recognition and cash flow from customer royalties; and
- cyclical fluctuations in semiconductor and consumer electronics markets generally.

Due to fluctuations in our operating results, reports from market and security analysts, litigation-related developments, and other factors, the price at which our common stock will trade is likely to continue to be highly volatile. In future periods, if our revenue, royalties, billings, cash flows or operating results are below the estimates or expectations of public market analysts and investors, our stock price could decline.

We may not continue to pay dividends at the same rate we are currently paying them, or at all, and any decrease in or suspension of the dividend could cause our stock price to decline.

We currently pay a quarterly dividend of $0.20 per share. We also have returned capital to shareholders through stock repurchases. We anticipate that all quarterly dividends and stock repurchases will be paid out of cash, cash equivalents and short-term investments. The payment of future cash dividends is subject to the final determination each quarter by our Board of Directors that the dividend remains in our best interests, which determination will be based on a number of factors, including our earnings, financial condition, actual and forecasted cash flows, capital resources and capital requirements, alternative uses of capital including business combinations, economic condition and other factors considered relevant by management and the Board of Directors. Any decrease in the amount of the dividend, or suspension or discontinuance of payment of a dividend, could cause our stock price to decline.

Our stock repurchase program could increase the volatility of the price of our common stock, and the program may be suspended or terminated at any time, which may cause the trading price of our common stock to decline.

In August 2007, we authorized a plan to repurchase our outstanding shares of common stock dependent on market conditions, share price and other factors. As of December 31, 2019, the total amount available for repurchase under the plan was $101.4 million.

The amount of repurchases under our stock repurchase program will vary. In 2016, we repurchased approximately 2,300,000 shares for an aggregate amount of $67.7 million. In 2017, we repurchased approximately 654,000 shares for an aggregate amount of $15.3 million. In 2018, we repurchased approximately 2,137,000 shares for an aggregate amount of $41.4 million. We did not repurchase any shares in 2019. Additionally, the timing of repurchases is at our discretion and the program may be suspended or discontinued at any time. Any suspension or discontinuation could cause the market price of our stock to decline. The timing of repurchases pursuant to our stock repurchase program could affect our stock price and increase its volatility. There can be no assurance that any stock repurchases will enhance stockholder value because the market price of our common stock may decline below the levels at which we effected repurchases. Furthermore, we may engage in mergers, acquisitions, or other activity that could result in us reducing or discontinuing share repurchases for a period of time. For example, the DTS acquisition resulted in a significant decrease in cash, cash equivalents and short-term investments, as well as the issuance of approximately $600 million in debt. The terms of our current or future debt agreements could limit our ability to repurchase shares.

Provisions of our certificate of incorporation and bylaws or Delaware law might delay or prevent a change of control transaction and depress the market price of our stock.

Various provisions of our certificate of incorporation and bylaws might have the effect of making it more difficult for a third party to acquire, or discouraging a third party from attempting to acquire, control of our company. These provisions could limit the price that certain investors might be willing to pay in the future for shares of our common stock. Certain of these provisions eliminate cumulative voting in the election of directors, authorize the board to issue "blank check" preferred stock, prohibit stockholder action by written consent, eliminate the right of stockholders to call special meetings, and establish advance notice procedures for director nominations by stockholders and the submission of other proposals for consideration at stockholder meetings. We are also subject to provisions of Delaware law that could delay or make more difficult a merger, tender offer or proxy contest involving our company. In particular, Section 203 of the Delaware General Corporation Law prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years unless specific conditions are met. Any of these provisions could have the effect of delaying, deferring or preventing a change in control, including without limitation, discouraging a proxy contest or making more difficult the acquisition of a substantial block of our common stock.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Our principal corporate headquarters, which house administrative, sales, marketing and research and development facilities, are located in San Jose, California, and are held under an operating lease. We own an office building in Calabasas, California that provides approximately 89,000 square feet to house additional administrative, sales, marketing, research and development personnel. We lease smaller facilities in other locations including the United States, Republic of Ireland, Romania, Hong Kong, China, the United Kingdom, Japan, South Korea, Taiwan, Singapore and Mexico. We believe that our existing space is adequate for our current operations. We believe that suitable replacement and additional space, to the extent needed, will be available in the future on commercially reasonable terms.

Item 3. Legal Proceedings

Other than to the extent the proceedings described below have concluded, we cannot predict the outcome of any of the proceedings described below. An adverse decision in any of these proceedings could significantly harm our business and our consolidated financial position, results of operations, and cash flows.

Tessera, Inc. v. Toshiba Corporation, Civil Action No. 5:15-cv-02543-BLF (N.D. Cal.)

On May 12, 2015, Tessera, Inc. filed a complaint against Toshiba Corporation ("Toshiba") in California Superior Court. Tessera, Inc.'s complaint alleges causes of action for breach of contract, breach of the implied covenant of good faith and fair dealing, and declaratory relief, generally alleging that Toshiba underpaid royalties and failed to cooperate with audits conducted pursuant to the parties' license agreement.

On June 8, 2015, Toshiba removed the action to the U.S. District Court for the Northern District of California. On June 18, 2015, Toshiba filed its answer, affirmative defenses, and counterclaims to Tessera, Inc.'s complaint. Toshiba alleges counterclaims for declaratory judgment and breach of the implied warranty of good faith and fair dealing. The counterclaims seek, among other things, judicial determinations about the interpretation of the parties' agreement, termination of the agreement, an accounting of the amount of alleged overpayments by Toshiba, restitution, and damages. On July 10, 2015, Tessera, Inc. filed its answer and affirmative defenses to Toshiba's counterclaims. On March 17, 2016, Tessera, Inc. filed an amended complaint adding a claim for declaratory relief regarding a February 12, 2016 letter sent by Toshiba to Tessera, Inc. purporting to terminate the parties' license agreement. On March 18, 2016, Toshiba filed its amended answer, affirmative defenses, and counterclaims. On April 4, 2016, Tessera, Inc. filed an answer to Toshiba's amended counterclaims.

An initial summary judgment hearing on contract issues took place on September 22, 2016. On November 7, 2016, the Court entered an order granting Toshiba's motion regarding the definition of "TCC," and denying summary judgment on the other issues raised by the parties' cross-motions. On December 6, 2016, Tessera, Inc. filed a motion pursuant to Federal Rule of Civil Procedure 54(b) seeking authorization to appeal the order and for a stay. On March 6, 2017, the Court granted the Rule 54(b) motion. The Court subsequently vacated the trial date and stayed the remainder of the district court proceedings.

On April 4, 2017, Tessera, Inc. filed a notice of appeal to the U.S. Court of Appeals for the Ninth Circuit. On November 21, 2018, the Ninth Circuit dismissed the appeal for lack of appellate jurisdiction and remanded the case to the district court for further proceedings.

On remand, the parties filed second round motions for summary judgment, and Toshiba filed a motion to strike two of Tessera's expert reports. On October 8, 2019, the Court granted Tessera's motion for summary judgment on Toshiba's counterclaim for a royalty refund. That counterclaim is now dismissed from the case. The Court also denied Toshiba's motion for summary judgment on all of Tessera's claims, and denied Toshiba's motion to strike Tessera's expert reports except to the extent that the reports contain legal opinions and expert testimony as to intent, motive, and state of mind. Trial is scheduled for October 19, 2020.

Invensas Corp., et al. v. NVIDIA Corp., Case No. 1:19-cv-00861-RGA (D. Del.)

On May 8, 2019, Invensas Corporation and Tessera Advanced Technologies, Inc. filed a complaint against NVIDIA Corporation ("NVIDIA") in the U.S. District Court for the District of Delaware. The complaint alleges that NVIDIA infringes U.S. Patent Nos. 6,232,231, 6,849,946, 7,064,005, 6,317,333, and 5,666,046 and requests, among other things, that NVIDIA be ordered to pay compensatory damages in an amount no less than a reasonable royalty. NVIDIA answered the complaint on July 1, 2019 and subsequently moved to transfer the case to the U.S. District Court for the Northern District of California. The Court denied NVIDIA's motion to transfer on September 17, 2019. A *Markman* hearing is scheduled for September 14, 2020, and a jury trial is scheduled to begin on September 20, 2021.

Confidential ICC Arbitration

On January 9, 2020, FotoNation Ltd. and Tessera Technologies, Inc. filed a Request for Arbitration against a FotoNation customer in the International Court of Arbitration of the International Chamber of Commerce. The Request generally alleges that the respondent breached an agreement to pay royalties under a technology agreement, and seeks damages and declaratory relief.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Since February 23, 2017, our common stock has traded publicly on The Nasdaq Global Select Market under the symbol "XPER." Prior to February 23, 2017, our common stock traded publicly on The Nasdaq Global Select Market under the symbol "TSRA". As of February 7, 2020, there were 49,861,846 outstanding shares of common stock held by 36 stockholders of record. In addition, a substantially greater number of stockholders may be "street name" or beneficial holders, whose shares are held of record by banks, brokers and other financial institutions.

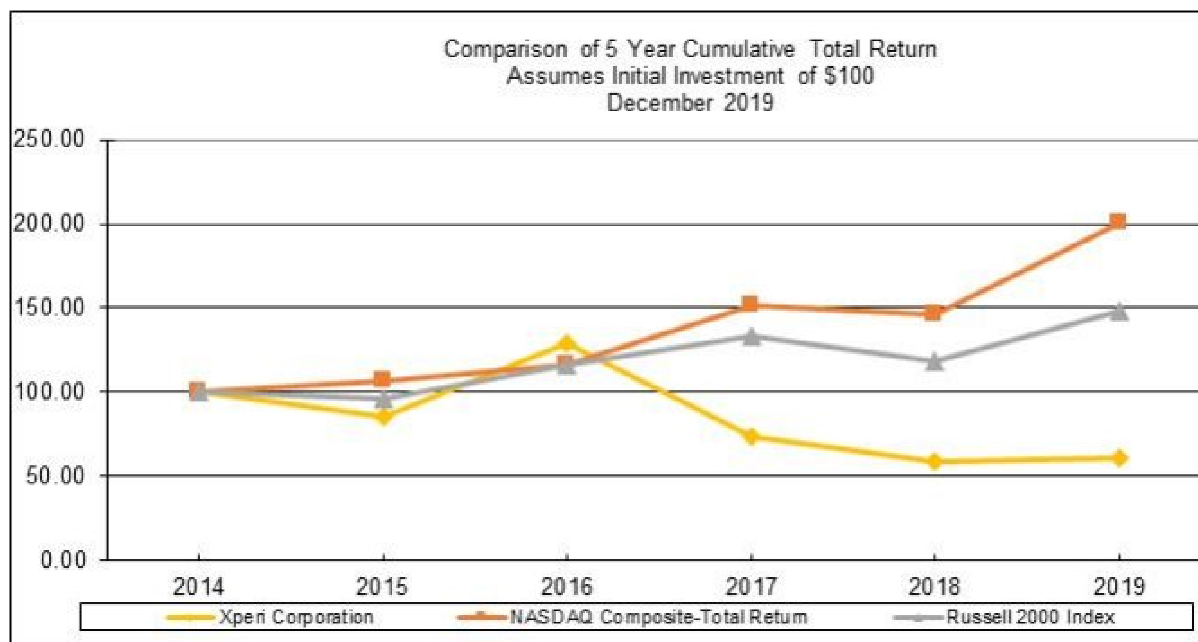
We also have historically returned capital to shareholders through stock repurchases. We anticipate that all quarterly dividends and stock repurchases will be paid out of cash, cash equivalents and short-term investments.

STOCK REPURCHASES

We made no stock repurchases during the fourth quarter of 2019. At December 31, 2019, the total amount available for repurchase under our stock repurchase program was $101.4 million.

PERFORMANCE GRAPH

The following graph shows a comparison of total stockholder return for holders of our common stock, the Nasdaq Composite Index and the Russell 2000 Index from December 31, 2014 through December 31, 2019. The graph and table assume that $100 was invested on December 31, 2014 in each of our common stock, the Nasdaq Composite Index and the Russell 2000 Index, and that all dividends were reinvested. This graphic comparison is presented pursuant to the rules of the SEC.



	12/14	12/15	12/16	12/17	12/18	12/19
Xperi Corporation	$ 100.00	$ 85.82	$ 129.58	$ 73.66	$ 58.11	$ 60.75
Nasdaq Composite	$ 100.00	$ 106.96	$ 116.45	$ 150.96	$ 146.67	$ 200.49
Russell 2000 Index	$ 100.00	$ 95.59	$ 115.95	$ 132.94	$ 118.30	$ 148.49

This section is not “soliciting material,” is not deemed “filed” with the SEC and is not incorporated by reference in any filing of the Company under the Securities Act of 1933 or the Securities Exchange Act of 1934 (“Exchange Act”), whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

Item 6. Selected Financial Data

The following selected consolidated financial data should be read in conjunction with "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.

	Years Ended December 31,				
	2019	2018 (2)	2017	2016 (1)	2015
	(in thousands, except per share data)				
Consolidated statements of operations data					
Revenue	$ 280,067	$ 406,133	$ 373,732	$ 259,565	$ 273,300
Total operating expenses	$ 348,775	$ 382,153	$ 405,232	$ 170,177	$ 111,098
Operating income (loss)	$ (68,708)	$ 23,980	$ (31,500)	$ 89,388	$ 162,202
Net income (loss)	$ (64,033)	$ (1,763)	$ (56,558)	$ 56,089	$ 117,016
Net income (loss) attributable to Xperi (3)	$ (62,530)	$ (289)	$ (56,558)	$ 56,089	$ 117,016
Income (loss) per share attributable to Xperi:					
Basic (4)	$ (1.27)	$ (0.01)	$ (1.15)	$ 1.14	$ 2.26
Diluted (4)	$ (1.27)	$ (0.01)	$ (1.15)	$ 1.12	$ 2.23
Cash dividends declared per share	$ 0.80	$ 0.80	$ 0.80	$ 0.80	$ 0.80
Weighted average number of shares used in per share calculation-basic (4)	49,120	48,823	49,251	49,187	51,802
Weighted average number of shares used in per share calculation-diluted (4)	49,120	48,823	49,251	50,190	52,586

	Years Ended December 31,				
	2019	2018	2017	2016	2015
	(in thousands)				
Consolidated statements of cash flows data:					
Net cash provided by operating activities (5)	$ 169,253	$ 135,133	$ 147,265	$ 153,860	$ 147,276

	December 31,				
	2019	2018	2017	2016	2015
	(in thousands)				
Consolidated balance sheets data:					
Cash, cash equivalents and short-term investments	$ 121,477	$ 154,364	$ 200,692	$ 113,005	$ 381,744
Working capital	$ 233,096	$ 343,378	$ 148,695	$ 148,924	$ 390,880
Total assets	$ 1,047,945	$ 1,235,107	$ 1,110,024	$ 1,186,436	$ 539,352
Debt (6)	$ 344,000	$ 494,000	$ 594,000	$ 600,000	$ —
Total Xperi stockholders' equity	$ 547,911	$ 619,442	$ 435,576	$ 507,785	$ 515,157

(1) 2016 includes one month of financial results from DTS as well as one-time acquisition related expenses. All periods subsequent to 2016 include financial results from DTS post-acquisition.
(2) We adopted ASU No. 2014-09 (Topic 606) "Revenue from Contracts with Customers" effective January 1, 2018, which had a material impact on the financial reporting of our operating results. We followed the modified retrospective transition method upon adoption, and under this method the comparative information for prior fiscal years has not been restated and continues to be reported under the accounting standards in effect for those periods.
(3) Excludes net income (loss) attributable to noncontrolling interest. See Note 1 of the Notes to Consolidated Financial Statements for further detail.
(4) See Note 11 of the Notes to Consolidated Financial Statements for an explanation of the methods used to determine the number of shares used to compute per share amounts.
(5) As a result of the adoption of ASU No. 2016-09, Compensation - Stock Compensation (Topic 718), we retrospectively adjusted our Consolidated Statements of Cash Flows to reclassify excess tax benefits of $8.2 million and $0.7 million from financing activities to operating activities in 2016 and 2015, respectively.
(6) Includes both the short-term and long-term portions of debt principal and excludes approximately $9.3 million, $11.8 million and $14.3 million in debt issuance costs as of December 31, 2019, 2018 and 2017, respectively.

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

The following discussion (presented in thousands, except for percentages) should be read in conjunction with our consolidated financial statements and notes thereto.

This section of this Form 10-K generally discusses 2019 and 2018 items and year-to-year comparisons between 2019 and 2018. Discussions of 2017 items and year-to-year comparisons between 2018 and 2017 that are not included in this Form 10-K can be found in "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Part II, Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2018, filed with the SEC on February 20, 2019, which is available free of charge on the SEC's website at www.sec.gov and our Investor Relations website at investor.xperi.com.

Business Overview

Xperi is a publicly-traded technology company with headquarters in Silicon Valley and operations around the world. Through its operating subsidiaries, Xperi creates, develops and licenses innovative audio, imaging, semiconductor packaging and interconnect technologies. We have approximately 700 employees and nearly 30 years of operating experience.

We license our innovative products, technologies and inventions to global electronics companies which, in turn, integrate the technologies into their own consumer electronics and semiconductor products. Our technologies and inventions are widely adopted and used every day by millions of people. Our audio technologies have shipped in billions of devices for the home, mobile and automotive markets. Our imaging technologies have been embedded in billions of smartphones and other mobile devices. Our semiconductor packaging and interconnect technologies have been licensed to more than 100 customers and have shipped in over 100 billion semiconductor chips.

On December 18, 2019, we entered into a definitive agreement with TiVo to combine in an all-stock merger of equals transaction. The transaction will create a leading consumer and entertainment technology licensing business and one of the industry's largest intellectual property (IP) licensing platforms with a diverse portfolio of entertainment and semiconductor intellectual property. The transaction is expected to close and become effective during the second quarter of 2020, subject to regulatory approvals, the approval by the shareholders of each company, and other customary closing conditions. For further discussion on the planned merger with TiVo, refer to "Item 1A. *Risk Factors*," and "Note 9 – *Acquisitions, Goodwill and Identifiable Intangible Assets*" in the Notes to Consolidated Financial Statements.

The planned merger with TiVo will result in material changes to the combined companies' balance sheet, results of operations and cash flows. Xperi and TiVo intend to refinance their existing indebtedness on a combined basis. We have obtained a bank commitment letter for an aggregate principal amount of $1,100 million in debt financing in order to pay transaction expenses in connection with the planned merger and to refinance the existing indebtedness of the Company and TiVo. As a result, the combined company's debt balance will increase substantially following the planned merger. Additionally, our combined revenue, operating expenses, and cash from operations should all increase, resulting in the trends noted below in our "Results of Operations" to be altered going forward.

Results of Operations

Significant events occurred over the past three years that affect the comparability of our financial statements. Key events and their financial impacts include the following:

- On December 10, 2018, we entered into an agreement with Samsung Electronics, Co., Ltd. ("Samsung") to settle and dismiss all pending litigation matters. In conjunction with the settlement, Samsung entered into a new patent license agreement with us. The settlement had a material impact on our financial results in 2018.
- On December 18, 2017, we entered into agreements with Broadcom Ltd. and certain of its affiliates ("Broadcom"), customers, and suppliers to settle and dismiss all pending litigation matters. In conjunction with the settlement, Broadcom entered into a new multi-year patent license agreement with us. The settlement had a material impact on our financial results in 2017.

We adopted the new accounting standard, ASU No. 2014-09 (Topic 606) "Revenue from Contracts with Customers" effective January 1, 2018, which had a material impact on the financial reporting of our operating results as described below. We followed the modified retrospective transition method upon adoption, and under this method the comparative information for prior fiscal years has not been restated and continues to be reported under the accounting standards in effect for those periods. Refer to "Note 4 – *Revenue*" in the Notes to Consolidated Financial Statements for detailed information.

The adoption of Topic 606 does not impact customer billings or the cash flow from our contracts with customers. We expect to experience greater variability in quarterly and annual revenue as a result of Topic 606 being applied to minimum guarantee and fixed fee licensing contracts. We place greater emphasis on billings and operating cash flows rather than revenue and net operating results to evaluate our financial performance in current and future periods.

Revenue

Our revenue is generated primarily from royalty and license fees. Revenue is recognized upon transfer of control of promised products, services or intellectual property and technologies ("IP") rights to customers in an amount that reflects the consideration that we expect to receive in exchange for those products, services or licensing of the IP rights.

Certain licensees have entered into fixed fee or minimum guarantee arrangements, whereby licensees pay a fixed fee for the right to incorporate our technology in the licensee's products over the license term. In arrangements with a minimum guarantee, the fixed fee component corresponds to a minimum number of units or dollars that the customer must produce or pay, with additional per-unit fees for any units or dollars exceeding the minimum. For these agreements, we recognize the full fixed fee amount as revenue at the beginning of the license term, when the licensee has the right to use the IP and begins to benefit from the license.

If the contract term of a fixed fee or minimum guarantee arrangement is longer than one year, we also consider the scheduled payment arrangements to determine whether a financing component exists. In general, if the payment arrangements extend beyond the initial twelve months of the contract, we treat a portion of the payments as a financing component. The discount rate used for each arrangement reflects the rate that would be used in a separate financing transaction between us and the licensee at contract inception, and takes into account the credit characteristics of the licensee and market interest rates as of the date of the agreement. As such, the amount of fixed fee revenue recognized at the beginning of the license term will be reduced by the calculated financing component. As payments are received from the licensee, we recognize a portion of the financing component through interest income.

For certain licensees, royalty revenue is generated based on a licensee's production or shipment of licensed products incorporating our IP, technologies or software. Licensees with a per-unit arrangement pay a per-unit royalty for each product manufactured or sold, as set forth in its license agreement. Licensees generally report manufacturing or sales information in the quarter subsequent to when such activity takes place. Under Topic 606, we estimate the royalties earned each quarter based on our forecast of manufacturing and sales activity incurred by our licensees in that quarter. Any differences between actual royalties owed by a licensee and our quarterly estimates are recognized in the following quarter, when the licensee's royalty report is received. Estimating licensees' quarterly royalties prior to receiving the royalty reports requires us to make significant assumptions and judgments related to forecasted trends and growth rates used to estimate quantities shipped by customers, which could have a material impact on the amount of revenue we report on a quarterly basis.

The timing of revenue recognition and the amount of revenue actually recognized for each type of revenue depends upon a variety of factors, including the specific terms of each arrangement, our ability to determine and allocate the transaction price to each separate performance obligation, and the nature of our deliverables and obligations. In addition, our royalty revenue will fluctuate based on a number of factors such as: (a) the rate of adoption and incorporation of our technology by licensees; (b) the demand for products incorporating semiconductors that use our licensed technology; (c) the cyclicality of supply and demand for products using our licensed technology; (d) volume incentive pricing terms in licensing agreements that may result in significant variability in quarterly revenue recognition from customers, and (e) the impact of economic downturns.

From time to time we enter into license agreements that have fixed expiration dates. Upon expiration of such agreements, we need to renew or replace these agreements in order to maintain our revenue base. We may not be able to continue licensing customers on terms favorable to us, under the existing terms or at all, which would in turn harm our results of operations.

In the past, we have engaged in litigation, arbitration proceedings, and royalty audits to directly or indirectly enforce our intellectual property rights and the terms of our license agreements, including proceedings to ensure proper and full payment of royalties by our current licensees and by third parties whose products incorporate our intellectual property rights.

The following table presents our historical operating results for the periods indicated as a percentage of revenue:

	Years ended December 31,		
	2019	2018	2017
Revenue:			
Royalty and license fees	100%	100%	100%
Total revenue	100	100	100
Operating expenses:			
Cost of revenue	3	3	1
Research, development and other related costs	40	26	28
Selling, general and administrative	44	32	39
Amortization expense	36	27	30
Litigation expense	2	6	10
Total operating expenses	125	94	108
Operating income (loss) from continuing operations	(25)	6	(8)
Interest expense	(8)	(6)	(8)
Other income and expense, net	3	2	—
Income (loss) before taxes	(30)	2	(16)
Provision for (benefit from) income taxes	(7)	2	(1)
Net loss	(23)%	(0)%	(15)%

The following table sets forth our revenue by year (in thousands, except for percentages):

	Years Ended December 31,			2019 vs. 2018	
	2019	2018	2017	Increase/(Decrease)	% Change
Royalty and license fees	$ 280,067	$ 406,133	$ 373,732	$ (126,066)	(31)%

The $126.1 million or 31% decrease in revenue resulted primarily from revenue recorded in 2018 attributable to the Samsung settlement and license agreement executed in December 2018, partially offset by a one-time payment in connection with a new license agreement signed in December of 2019.

The following table sets forth our billings by year (in thousands, except for percentages):

	Years Ended December 31,			2019 vs. 2018	
	2019	2018	2017	Increase/(Decrease)	% Change
Total billings	$ 413,921	$ 447,347	$ 422,476	$ (33,426)	(7)%

The $33.4 million or 7% decrease in billings was primarily driven by the declines in Semiconductor and IP Licensing billings resulting from certain settlement and license agreements expiring at the end of 2018 and declines in payments from existing settlement and license agreements, and secondarily by a decline of $11.6 million in billings in the mobile market principally due to an ongoing contract interpretation issue with a customer. The decline was partially offset by increased billings in 2019 from the Samsung settlement and license agreement executed in December 2018 and a one-time payment from a new license agreement signed in December 2019.

With changes in revenue recognition due to the adoption of Topic 606 in 2018, we anticipate our revenue for 2020 will continue to be significantly impacted by our inability to record future billings as revenue in 2020 and later periods from minimum guarantee and fixed fee licensing contracts in place prior to adoption of Topic 606 on January 1, 2018 and from significant fixed fee contracts taken to revenue prior to 2020. This accounting change will not impact billings or the cash flow from these contracts. Furthermore, we may experience greater variability in quarterly and annual revenue in future periods as a result of the revenue accounting treatment applied to future minimum guarantee and fixed fee licensing contracts. Management places greater emphasis on billings and cash flows, rather than revenue and net operating results, to internally evaluate our financial performance.

Cost of Revenue

Cost of revenue consists of royalties paid to third parties and direct compensation and related expenses to provide NRE services.

Cost of revenue for the year ended December 31, 2019 was $8.5 million, as compared to $13.3 million for the year ended December 31, 2018. The decrease was primarily due to lower royalties accrued and paid to a third party in connection with a Product Licensing segment contract.

Research, Development and Other Related Costs

Research and development ("R&D") is conducted primarily in-house and targets development of audio and image enhancement technologies, chip-scale, multi-chip and wafer level packaging, circuitry, 3D-IC architectures, wafer and die bonding technologies and new machine learning based hardware and software solutions, including semiconductor chip design and fabrication costs. Research, development and other related costs include expenses associated with applications engineering necessary to port and integrate our technologies and products on third party silicon and into end devices. These costs consist primarily of compensation and related costs for personnel, engineering consulting expenses associated with new product and technology development, product commercialization, quality assurance and testing costs, as well as costs related to patent applications and examinations, product "tear downs" and reverse engineering, materials, supplies and equipment depreciation. All research, development and other related costs are expensed as incurred.

Research, development and other related costs for the year ended December 31, 2019 were $112.3 million, as compared to $106.4 million for the year ended December 31, 2018, an increase of $5.9 million or 6%. The increase was primarily driven by an increase of $1.9 million in facility related expense, an increase of $1.5 million in personnel related expenses associated with higher headcount in a new subsidiary focused on a new hardware and software platform that delivers machine learning-based technology, an increase of $1.5 million in stock-based compensation resulting from higher stock unit grants provided to employees for reaching specific product development milestones in the fourth quarter of 2019, and an increase of $1.0 million in software and licensing subscriptions.

We believe that a significant level of research and development expenses will be required for us to remain competitive in the future, and we expect total R&D expense will continue to increase in 2020 as compared to 2019.

Selling, General and Administrative

Selling expenses consist primarily of compensation and related costs for sales and marketing personnel engaged in sales and licensee support, reverse engineering personnel and services, marketing programs, public relations, promotional materials, travel, trade show expenses and stock-based compensation expense. General and administrative expenses consist primarily of compensation and related costs for general management, information technology, finance personnel, legal fees and expenses, facilities costs, stock-based compensation expense and professional services. Our general and administrative expenses, other than facilities related expenses, are not allocated to other expense line items.

Selling, general and administrative expenses for the year ended December 31, 2019 were $122.9 million, as compared to $127.9 million for the year ended December 31, 2018, a decrease of $5.0 million or 4%. The decrease was primarily due to a $6.8 million decrease in personnel and retention bonus expenses, a $0.9 million decrease in stock-based compensation, and a $1.1 million decrease in bank fees due to debt modification and repricing activities in the first quarter of 2018, partially offset by $4.6 million in transaction costs related to the planned TiVo merger in 2019.

Amortization Expense

Amortization expense for the year ended December 31, 2019 was $99.9 million, as compared to $108.5 million for the year ended December 31, 2018, a decrease of $8.6 million. The decrease was primarily attributable to certain intangible assets becoming fully amortized over the past twelve months.

We anticipate that amortization expenses will continue to be a significant expense since we acquired approximately $479 million in intangible assets from the acquisition of DTS and other acquisition activity in 2016, which will be amortized over the next several years. See Note 9 – "*Acquisitions, Goodwill and Identifiable Intangible Assets*" in Notes to Consolidated Financial Statements for additional information.

Litigation Expense

Litigation expense for the year ended December 31, 2019 was $5.1 million, as compared to $26.1 million for the year ended December 31, 2018, a decrease of $21.0 million. The decrease was primarily related to our settlement with Samsung in the fourth quarter of 2018, partially offset by an increase in NVIDIA related litigation expenditure during 2019.

We expect that litigation expense may continue to be a material portion of our operating expenses in future periods, and may fluctuate between periods, because of planned or ongoing litigation, as described in Part I, Item 3 – *Legal Proceeding*s, and because of litigation planned for or initiated from time to time in the future in order to enforce and protect our intellectual property and contract rights. We currently expect litigation expense to increase in 2020 as compared to 2019 based on expected case activity on matters currently outstanding and the initiation of an arbitration matter in the first quarter of 2020.

Upon expiration of our customers' licenses, if those licenses are not renewed, litigation may become necessary to secure payment of reasonable royalties for the use of our patented technology. If we plan for or initiate such litigation, our future litigation expenses may increase.

Stock-based Compensation Expense

The following table sets forth our stock-based compensation expense for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Years Ended December 31,		
	2019	**2018**	**2017**
Research, development and other related costs	$ 14,643	$ 13,168	$ 13,277
Selling, general and administrative	16,911	17,843	20,185
Total stock-based compensation expense	$ 31,554	$ 31,011	$ 33,462

Stock-based compensation awards include employee stock options, restricted stock awards and units, and employee stock purchases. For the year ended December 31, 2019, stock-based compensation expense was $31.6 million, of which $0.2 million related to employee stock options, $29.1 million related to restricted stock awards and units and $2.3 million related to employee stock purchases. For the year ended December 31, 2018, stock-based compensation expense was $31.0 million, of which $0.4 million related to employee stock options, $28.0 million related to restricted stock awards and units and $2.6 million related to employee stock purchases. The increase in stock-based compensation expense in 2019 compared to 2018 was due primarily to a higher volume of restricted stock unit grants.

Interest Expense

Interest expense for the year ended December 31, 2019 was $23.4 million, as compared to $25.7 million for the year ended December 31, 2018. The decrease in interest expense in 2019 was primarily a result of a lower average debt balance as compared to 2018 as we continued making voluntary principal payments in 2019, partially offset by higher LIBOR rates through mid-2019 impacting the variable rate included in our debt. Interest expense may increase in future periods if interest rates increase during 2020 and in future years.

Other Income and Expense, Net

Other income and expense, net, for the year ended December 31, 2019 was $9.0 million, as compared to $8.6 million for the year ended December 31, 2018. Other income was higher in the current year principally due to recognition of an unrealized loss of $2.2 million on our equity investment in Onkyo stock in 2018, partially offset by $1.9 million lower interest income earned from financing components under Topic 606 in 2019 as compared to 2018.

Provision for (benefit from) Income Taxes

For the year ended December 31, 2019, we recorded an income tax benefit of $19.0 million on a pretax loss of $83.1 million, which resulted in an effective tax rate of 22.9%. The income tax benefit for the year ended December 31, 2019 was primarily related to tax benefit from operating losses, tax credits, the release of valuation allowance on certain deferred tax assets related to tax credits, and deduction for foreign-derived intangible income ("FDII"), offset by an increase in valuation allowance against deferred tax assets primarily related to capitalized research expenses, foreign withholding taxes, non-deductible stock-based compensation and certain non-deductible expenses.

For the year ended December 31, 2018, we recorded an income tax expense of $8.7 million on pretax income of $6.9 million, which resulted in an effective tax rate of 125.5%. The income tax expense for the year ended December 31, 2018 was primarily related to foreign withholding taxes, certain non-deductible permanent differences, valuation allowance recorded against our unutilized tax credits, and shortfalls from stock-based compensation offset by tax benefit from the utilization of foreign tax credits and a deduction for foreign-derived income.

The change from income tax expense to income tax benefit for the year ended December 31, 2019 as compared to the prior year is largely attributable to operating losses and the release of valuation allowance on certain U.S. federal deferred taxes recognized in the current year.

During the fourth quarter of 2019, we filed a refund claim for foreign taxes previously withheld by licensees in Korea, based on recent court rulings in Korea and other business factors. These withheld foreign taxes were claimed as a foreign tax credit in the U.S. As a result of the refund claim, we recorded a non-current income tax receivable of $65.2 million in other long-term assets, an unrecognized tax benefit of $48.2 million recorded in other long-term liabilities, and a reduction in deferred tax assets of $17.0 million. At December 31, 2019, we recorded a foreign exchange loss of $0.7 million.

We released valuation allowance against certain U.S. federal deferred tax assets as a result of filing a foreign tax refund claim that is expected to reduce U.S. tax credits (see discussion above). We also increased our valuation allowance against certain U.S. federal, U.S. state, and foreign deferred tax assets. The need for a valuation allowance requires an assessment of both positive and negative evidence when determining whether it is more likely than not that deferred tax assets are recoverable. Such assessment is required on a jurisdiction-by-jurisdiction basis. In making such assessment, significant weight is given to evidence that can be objectively verified such as recent earnings (or loss) history, carryback of certain tax attributes and reversals of existing taxable temporary differences. Lesser weight is given to subjective evidence such as tax-planning strategies and projected future income based on management's assumptions. After considering both positive and negative evidence, we released valuation allowance on U.S. federal tax credits since it was more likely than not that these tax attributes would be utilized as a result of the foreign tax refund filing. Additionally, we increased our valuation allowance on deferred tax assets primarily related to U.S. federal capitalized research expenses, U.S. state deferred tax assets, and certain foreign deferred tax assets based on our recent financial results and having insufficient objectively verifiable future sources of income.

In the future, we may release valuation allowance and recognize certain deferred tax assets depending on achievement of future profitability in relevant jurisdictions or implementation of tax planning strategies that enable us to utilize deferred tax assets that would otherwise be unused. Any release of valuation allowance could have the effect of decreasing the income tax provision in the period the valuation allowance is released. We continue to monitor the likelihood that we will be able to recover our deferred tax assets, including those for which a valuation allowance is recorded. There can be no assurance that we will generate profits or implement tax strategies in future periods enabling us to fully realize our deferred tax assets. The timing of recording a valuation allowance or the reversal of such valuation allowance is subject to objective factors that cannot be readily predicted in advance. Adjustments could be required in the future if we conclude that it is more likely than not that deferred tax assets are not recoverable. A provision for a valuation allowance could have the effect of increasing the income tax provision in the period the valuation allowance is recorded.

Segment Operating Results

We operate in two reportable segments: (1) Product Licensing and (2) Semiconductor and IP Licensing. There are certain corporate overhead costs that are not allocated to these reportable segments because these operating amounts are not considered in evaluating the operating performance of our business segments.

The Chief Executive Officer is also the Chief Operating Decision Maker ("CODM") as defined by the authoritative guidance on segment reporting.

The Product Licensing segment is comprised of our Audio and Imaging businesses, which we license through the DTS, HD Radio, and IMAX Enhanced brands. These licenses typically include the delivery of software and/or hardware-based solutions to our customers or to their suppliers. Product Licensing revenue is derived primarily from sales into the home, automotive and mobile markets.

The Semiconductor and IP Licensing segment includes our Tessera, Invensas and Invensas Bonding Technologies subsidiaries, which license semiconductor packaging and interconnect technologies and associated intellectual property. Semiconductor and IP Licensing revenue is derived from technology and IP licenses to semiconductor companies, foundries and packaging companies. We have a long history of developing and monetizing next-generation technologies, including chip-scale and multi-chip packaging solutions as well as low-temperature wafer and die bonding solutions. Today, we are actively developing and licensing 3D semiconductor packaging, interconnect and bonding solutions for semiconductors that are used in every day products such as smartphones, tablets, and laptops as well as servers used in datacenters. We also provide engineering services to our customers to assist them in their evaluation and adoption of our technologies including the transition into high volume production.

We do not identify or allocate assets by reportable segment, nor does the CODM evaluate reportable segments using discrete asset information. Reportable segments do not record inter-segment revenue and accordingly there are none to report. Although

the CODM uses operating income to evaluate reportable segments, operating costs included in one segment may benefit other segments.

The following table sets forth our segment revenue, operating expenses and operating income for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Revenue:			
Product licensing segment	$ 198,124	$ 219,708	$ 167,923
Semiconductor and IP licensing segment	81,943	186,425	205,809
Total revenue	280,067	406,133	373,732
Operating expenses:			
Product licensing segment	181,804	180,727	172,745
Semiconductor and IP licensing segment	44,074	73,519	87,838
Unallocated operating expenses (1)	122,897	127,907	144,649
Total operating expenses	348,775	382,153	405,232
Operating income (loss):			
Product licensing segment	16,320	38,981	(4,822)
Semiconductor and IP licensing segment	37,869	112,906	117,971
Unallocated operating expenses (1)	(122,897)	(127,907)	(144,649)
Total operating income (loss)	$ (68,708)	$ 23,980	$ (31,500)

(1) Unallocated operating expenses consist primarily of selling, general and administrative expenses, such as administration, human resources, finance, information technology, corporate development and procurement. These expenses are not allocated because these amounts are not considered in evaluating the operating performance of our business segments.

For the year ended December 31, 2019, the unallocated expenses were $122.9 million compared to $127.9 million for the year ended December 31, 2018. The decrease of $5.0 million was primarily attributable to a $6.8 million decrease in personnel and retention bonus expenses, a $1.1 million decrease in stock-based compensation, and a $1.1 million decrease in bank fees due to debt modification and repricing activities in the first quarter of 2018, partially offset by $4.6 million transaction costs related to the planned TiVo merger in 2019.

The revenue and operating income amounts in this section have been presented on a basis consistent with GAAP applied at the segment level. Of our $385.8 million in goodwill at December 31, 2019, approximately $378.1 million is allocated to our Product Licensing segment and approximately $7.7 million is allocated to our Semiconductor and IP Licensing segment.

Product Licensing Segment

	Years Ended December 31,		
	2019	2018	2017
		(in thousands)	
Revenue:			
Royalty and license fees	$ 198,124	$ 219,708	$ 167,923
Total revenue	198,124	219,708	167,923
Operating expenses:			
Cost of revenues	8,460	13,291	6,308
Research, development and other related costs	83,613	78,892	75,809
Litigation	1,656	—	288
Amortization	88,075	88,544	90,340
Total operating expenses (1)	181,804	180,727	172,745
Total operating income (loss)	$ 16,320	$ 38,981	$ (4,822)

(1) Excludes operating expenses which are not allocated on a segment basis.

Product Licensing revenue for the year ended December 31, 2019 was $198.1 million as compared to $219.7 million for the year ended December 31, 2018, a decrease of $21.6 million. The decrease in revenue was primarily due to the timing and

duration of minimum guarantee contracts up for renewal and executed, decreased NRE services revenue, as well as a decrease in per-unit royalty revenue in 2019 as compared to 2018.

The following table sets forth our billings by year (in thousands, except for percentages):

	Years Ended December 31,			2019 vs. 2018	
	2019	2018	2017	Increase/(Decrease)	% Change
Product licensing billings	$ 210,285	$ 221,043	$ 215,822	$ (10,758)	(5)%

The decrease in billings was primarily driven by a decline in billings in the mobile market, due principally to an ongoing contract interpretation issue with a customer, and secondarily by decreased NRE billings from the automotive market.

Due to adoption of Topic 606, we continue to expect greater variability in quarterly and annual revenue in our Product Licensing segment in future periods as a result of the revenue accounting treatment applied to minimum guarantee and fixed fee licensing contracts.

The increase of $1.1 million in total operating expenses in 2019 as compared to 2018 was primarily driven by an increase in R&D expense due to higher headcount and stock-based compensation, partially offset by lower cost of revenue from royalties accrued and paid to a third party.

We expect R&D expense will continue to be significant in this segment as we develop new products and solutions.

Operating income for the years ended December 31, 2019 and 2018 was $16.3 million and $39.0 million, respectively, which represented a decrease of $22.7 million, for the reasons stated above.

Semiconductor and IP Licensing Segment

	Years Ended December 31,		
	2019	2018	2017
	(in thousands)		
Revenue:			
Royalty and license fees	$ 81,943	$ 186,425	$ 205,809
Total revenue	81,943	186,425	205,809
Operating expenses:			
Research, development and other related costs	28,732	27,514	30,039
Litigation	3,471	26,099	36,209
Amortization	11,871	19,906	21,590
Total operating expenses (1)	44,074	73,519	87,838
Total operating income	$ 37,869	$ 112,906	$ 117,971

(1) Excludes operating expenses which are not allocated on a segment basis.

Semiconductor and IP Licensing segment revenue for the year ended December 31, 2019 was $81.9 million as compared to $186.4 million for the year ended December 31, 2018, a decrease of $104.5 million. The decrease in revenue was due principally to revenue recorded in 2018 related to the Samsung settlement and license agreement executed in December 2018, partially offset by a one-time payment from a new license agreement signed in December 2019.

The following table sets forth our billings by year (in thousands, except for percentages):

	Years Ended December 31,			2019 vs. 2018	
	2019	2018	2017	Increase/(Decrease)	Change
Semiconductor and IP licensing billings	$ 203,636	$ 226,304	$ 206,654	$ (22,668)	(10)%

The decrease in billings was due principally to certain settlement and license agreements expiring at the end of 2018 and declines in payments from existing settlement and license agreements, partially offset by increased billings in 2019 from the Samsung settlement and license agreement executed in December 2018 and a one-time payment from a new license agreement signed in December 2019.

Due to adoption of Topic 606, we anticipate Semiconductor and IP Licensing revenue for 2020 will continue to be significantly impacted due principally to our inability to record further billings as revenue in 2020 and later periods from minimum guarantee and fixed fee licensing contracts in place prior to the start of 2018. Further, we expect greater variability in quarterly and annual revenue in our Semiconductor and IP Licensing segment in future periods as a result of the revenue accounting treatment applied to minimum guarantee and fixed fee licensing contracts, which will necessitate recognizing revenue in the quarter a contract first becomes effective.

The decrease of $29.4 million in total operating expenses in 2019 as compared to 2018 resulted primarily from lower litigation costs as a result of concluding the legal proceedings against Samsung in December 2018, and secondarily from lower R&D costs driven principally by lower personnel and bonus expenses, and lower amortization. The lower amortization was attributable to certain intangible assets becoming fully amortized over the past twelve months.

We expect that litigation expense will continue to be a material portion of the Semiconductor and IP Licensing segment's operating expenses in future periods, and may fluctuate significantly in some periods, because of our ongoing legal actions, as described in Part I, Item 3 - *Legal Proceedings*, and because we may become involved in other litigation from time to time in the future in order to enforce and protect our intellectual property and contract rights.

Operating income for the years ended December 31, 2019 and 2018 was $37.9 million and $112.9 million, respectively, which represented a decrease of $75.0 million, for the reasons stated above.

Liquidity and Capital Resources

	December 31,		
(in thousands, except for percentages)	**2019**	**2018**	**2017**
Cash and cash equivalents	$ 74,551	$ 113,625	$ 138,260
Short-term investments	46,926	40,739	62,432
Total cash, cash equivalents and short-term investments	$ 121,477	$ 154,364	$ 200,692
Percentage of total assets	12%	12%	18%

	Years Ended December 31,		
	2019	**2018**	**2017**
Net cash from operating activities	$ 169,253	$ 135,133	$ 147,265
Net cash from investing activities	$ (19,143)	$ 11,432	$ (18,844)
Net cash from financing activities	$ (189,184)	$ (171,200)	$ (55,787)

Our primary sources of liquidity and capital resources are our operating cash flows and our investment portfolio. Cash, cash equivalents and short-term investments were $121.5 million at December 31, 2019, a decrease of $32.9 million from $154.4 million at December 31, 2018. The decrease resulted primarily from $150.0 million in voluntary pay-down of debt principal, $39.5 million in dividends paid, and $8.8 million of capital expenditures, partially offset by $169.3 million in cash from operations.

Cash flows provided by operations were $169.3 million for the year ended December 31, 2019, primarily due to our net loss of $64.0 million being adjusted for non-cash items of depreciation of $6.7 million, amortization of intangible assets of $99.9 million, stock-based compensation expense of $31.6 million and $131.0 million in changes in operating assets and liabilities. These increases were partially offset by a reduction of $38.6 million in deferred income taxes.

Cash flows provided by operations were $135.1 million for the year ended December 31, 2018, primarily due to the net loss of $1.8 million being adjusted for the non-cash items of depreciation of $6.7 million, amortization of intangible assets of $108.5 million, stock-based compensation expense of $31.0 million, and $2.7 million in amortization of total debt issuance costs. These increases were partially offset by a reduction of $15.6 million in deferred income taxes.

Net cash used in investing activities was $19.1 million for the year ended December 31, 2019, primarily related to the purchases of short-term available-for-sales securities of $40.0 million, $8.8 million in capital expenditures and patent acquisition of $4.5 million, partially offset by maturities and sales of securities of $34.1 million.

Net cash provided by investing activities was $11.4 million for the year ended December 31, 2018, primarily related to maturities and sales of securities of $39.5 million, partially offset by purchases of securities of $20.1 million, purchases of intangible assets of $4.1 million and capital expenditures of $3.3 million.

Net cash used in financing activities was $189.2 million for the year ended December 31, 2019 principally due to $150.0 million in partial pay-down of debt principal, $39.5 million in dividends paid and $4.5 million in repurchases of common stock, partially offset by $6.0 million in proceeds due to the issuance of common stock under our employee stock option programs and employee stock purchase plans.

Net cash used in financing activities was $171.2 million for the year ended December 31, 2018 principally due to $100.0 million in voluntary pay-down of debt principal, $39.2 million in dividends paid and $44.8 million in repurchases of common stock, partially offset by $13.2 million in proceeds from the exercise of stock options and employee stock purchases stock purchase plans.

The primary objectives of our investment activities are to preserve principal and to maintain liquidity while at the same time capturing a market rate of return. To achieve these objectives, we maintain a diversified portfolio of securities including money market funds and debt securities including corporate bonds and notes, municipal bonds and notes, commercial paper, treasury and agency notes and bills and certificates of deposit. We invest excess cash predominantly in high-quality investment grade debt securities with less than three years to maturity. Our marketable debt securities are classified as available-for-sale and are reported at fair value, with unrealized gains and losses, net of tax, recorded in accumulated other comprehensive income. The fair values for our securities are determined based on quoted market prices as of the valuation date and observable prices for similar assets. In the third quarter of 2018, we initiated an equity position in Onkyo Corporation, a publicly traded company listed on the JASDAQ market of the Tokyo Stock Exchange. Under Topic 321, we measure equity securities with readily determinable market value at fair value and recognize any changes in fair value in net income (loss). We recorded an unrealized loss of approximately $0.9 million on this investment in 2019, and we have recorded cumulative unrealized losses of $2.3 million since we made this investment. On July 5, 2019, we sold approximately 2.8 million shares of Onkyo stock (out of a total holding of 7.0 million shares), and we intend to sell the remaining shares over time depending on market conditions.

We evaluate our debt securities periodically for possible other-than-temporary impairment and review factors such as the length of time and extent to which fair value has been below cost basis, the financial condition of the issuer, and our ability and intent to hold the security until maturity on a more likely than not basis. If declines in the fair value of those investments are determined to be other-than-temporary, we report the credit loss portion of such decline in other income and expense, on a net basis, and the remaining noncredit loss portion in accumulated other comprehensive income. For the years ended December 31, 2019, 2018 and 2017, no impairment charges were recorded with respect to our investments in debt securities.

On December 1, 2016, we entered into a Credit Agreement which provided for a $600.0 million seven-year Term Loan B facility. The Term B Loan facility matures on November 30, 2023. Upon the closing of the Credit Agreement, we borrowed $600.0 million under the Term B Loan facility. These proceeds were used on December 1, 2016, together with cash and cash equivalents, to finance the acquisition of DTS. The obligations under the Credit Agreement are guaranteed by substantially all of our assets pursuant to the Security Agreement, dated December 1, 2016, among us, Royal Bank of Canada, as collateral agent, and the other pledgors party thereto. On January 23, 2018, we completed a repricing of our debt, reducing the borrowing rate by 75 basis points, and paid down $100.0 million in principal balance. During 2019, we made three voluntary principal payments totaling $150.0 million.

At December 31, 2019, $344.0 million was outstanding under this loan facility with an interest rate, including amortization of debt issuance costs, of 5.4%. Interest is payable monthly. As the cumulative $250.0 million prepayments of debt principal we made during 2018 and 2019 exceeded the minimum principal payment requirements, we expect to have no further principal payment requirements until maturity of the loan, subject to our expected achievement of a net leverage ratio, as defined in the loan agreement, below 2.0 at the end of each fiscal year end. Because the interest rate on the loan facility is variable, we are subject to variations in our cash flows based on changes in market interest rates.

In connection with the planned merger with TiVo, Xperi and TiVo intend to refinance each company's debt on a combined basis upon closing of the transaction, which is currently expected in the second quarter of 2020. To meet this objective, we have secured $1.1 billion of committed financing pursuant to a debt commitment letter (the "Commitment Letter") dated December 18, 2019, from Bank of America and Royal Bank of Canada. On January 3, 2020, Barclays Bank PLC ("Barclays") was added as an additional initial lender and an additional joint lead arranger and joint bookrunner and was reallocated a portion of the debt commitments of Bank of America and Royal Bank of Canada under the Commitment Letter.

In August 2007, our Board of Directors (the “Board”) authorized a plan to repurchase our outstanding shares of common stock dependent on market conditions, share price and other factors. In January 2016, the Board authorized an additional $200 million in future repurchases under the plan, and as of December 31, 2019, the total amount available for repurchase under the plan was $101.4 million. No expiration has been specified for this plan. Since the inception of the plan, and through December 31, 2019, we have repurchased approximately 13.3 million shares of common stock at a total cost of $348.6 million at an average price of $26.25.

In 2019, 2018 and 2017, we paid quarterly dividends of $0.20 per share in each of March, June, September and December.

We believe that based on current levels of operations and anticipated growth, our cash from operations, together with cash, cash equivalents and short-term investments currently available, will be sufficient to fund our operations, debt service, dividends and stock repurchases and acquisition needs for at least the next twelve months. Poor financial results, unanticipated expenses, unanticipated acquisitions of technologies or businesses or unanticipated strategic investments could give rise to additional financing requirements sooner than we expect. There can be no assurance that equity or debt financing will be available when needed or, if available, that such financing will be on terms satisfactory to us and not dilutive to our then-current stockholders.

Contractual Cash Obligations

	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	4-5 Years	Thereafter
	(In thousands)				
Debt (1)	$ 344,000	$ —	$ —	$ 344,000	$ —
Operating lease obligations (2)	$ 22,035	$ 6,387	$ 7,817	$ 5,854	$ 1,977

(1) Under our debt agreement, our debt bears a variable interest rate. See “Note 10 – *Debt*” for additional detail.
(2) Refer to “Note 8 – *Leases*” for additional detail

The amounts reflected in the table above for operating lease obligations represent aggregate future minimum lease payments under non-cancelable facility and equipment operating leases. For our facilities leases, rent expense charged to operations differs from rent paid because of scheduled rent increases. Rent expense is calculated by amortizing total rental payments on a straight-line basis over the lease term.

As of December 31, 2019, we have accrued $76.8 million of unrecognized tax benefits in long term income taxes payable related to uncertain tax positions, which includes $1.2 million of accrued interest. At this time, we are unable to reasonably estimate the timing of the long-term payments or the amount by which the liability will increase or decrease over time. If we are successful in receiving our Korean withholding tax refund of $64.6 million, net of foreign exchange, then $48.2 million of unrecognized tax benefit would be payable to the U.S. tax authorities. These amounts, which are included in our financial statements, have not been included in the table above.

Under certain contractual agreements, we may be obligated to pay up to approximately $10.7 million over an estimated period of approximately five years if certain milestones are achieved.

See “Note 15 – *Commitments and Contingencies*” of the Notes to Consolidated Financial Statements for additional detail.

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 Estimates

Management’s discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements. These financial statements have been prepared in conformity with generally accepted accounting principles (“GAAP”) in the United States which requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses, and related disclosure of contingent assets and liabilities. By their nature, these estimates and judgments are subject to an inherent degree of uncertainty. We evaluate our estimates based on our historical experience and various other assumptions that are believed to be reasonable under the circumstances. These estimates relate to revenue recognition, the assessment of recoverability of goodwill and intangible assets, the valuation and recognition of stock-based compensation expense, the valuation of investments, business combinations, recognition and measurement of deferred

income tax assets and liabilities, the assessment of unrecognized tax benefits, and others. Actual results could differ from those estimates, and material effects on our operating results and financial position may result.

We believe the following accounting policies and estimates are most critical to the understanding of our consolidated financial statements. See “Note 2 - *Summary of Significant Accounting Policies*” and “Note 4 - *Revenue*” of the Notes to Consolidated Financial Statements for a full description of our accounting policies.

Revenue recognition

Our revenue is generated primarily from royalty and license fees. Revenue is recognized upon transfer of control of promised products, services or intellectual property and technologies (“IP”) rights to customers in an amount that reflects the consideration that we expect to receive in exchange for those products, services or licensing of the IP rights.

Certain licensees have entered into fixed fee or minimum guarantee arrangements, whereby licensees pay a fixed fee for the right to incorporate our technology in the licensee’s products over the license term. In arrangements with a minimum guarantee, the fixed fee component corresponds to a minimum number of units or dollars that the customer must produce or pay, with additional per-unit fees for any units or dollars exceeding the minimum. For both fixed fee and minimum guarantee agreements, we recognize the full fixed fee as revenue at the beginning of the license term, when the licensee has the right to use the IP and begins to benefit from the license.

If the contract term of a fixed fee or minimum guarantee arrangement is longer than one year, we also consider the scheduled payment arrangements to determine whether a financing component exists. In general, if the payment arrangements extend beyond the initial twelve months of the contract, we treat a portion of the payments as a financing component. The discount rate used for each arrangement reflects the rate that would be used in a separate financing transaction between us and the licensee at contract inception and takes into account the credit characteristics of the licensee and market interest rates as of the date of the agreement. As such, the amount of fixed fee revenue recognized at the beginning of the license term will be reduced by the calculated financing component. As payments are received from the licensee, we recognize a portion of the financing component through interest income.

For certain licensees, royalty revenue is generated based on a licensee’s production or shipment of licensed products incorporating our IP, technologies or software. Licensees with a per-unit arrangement pay a per-unit royalty for each product manufactured or sold, as set forth in its license agreement. Licensees generally report manufacturing or sales information in the quarter subsequent to when such activity takes place. Under Topic 606, we estimate the royalties earned each quarter based on our forecast of manufacturing and sales activity incurred by our licensees in that quarter. Any differences between actual royalties owed by a licensee and our quarterly estimates are recognized in the following quarter, when the licensee’s royalty report is received. Estimating licensees’ quarterly royalties prior to receiving the royalty reports requires us to make significant assumptions and judgments that could have a material impact on the amount of revenue we report on a quarterly basis.

Valuation of goodwill and intangible assets

We make judgments about the recoverability of intangible assets whenever events or changes in circumstances indicate that impairment may exist. If such facts and circumstances exist, we assess recoverability by comparing the projected undiscounted net cash flows associated with the related asset or group of assets over their remaining lives against their respective carrying amounts. Impairments, if any, are based on the excess of the carrying amount over the fair value of those assets. If the useful life is shorter than originally estimated, we accelerate the rate of amortization and amortize the remaining carrying value over the new shorter useful life. Such changes could result in impairment charges or higher amortization expense in future periods, which could have a significant impact on our operating results and financial condition.

We perform an annual review of the valuation of goodwill in the fourth quarter, or more often if indicators of impairment exist. Triggering events for impairment reviews may be indicators such as adverse industry or economic trends, restructuring actions, lower projections of profitability, or a sustained decline in our market capitalization. Evaluations of possible impairment and, if applicable, adjustments to carrying values require us to estimate, among other factors, future cash flows, useful lives, and fair market values of our reporting units and assets. When we conduct our evaluation of goodwill, the fair value of goodwill is assessed using valuation techniques that require significant management estimates and judgment. Should conditions be different from management’s last assessment, significant impairments of goodwill may be required, which would adversely affect our operating results.

Stock-based compensation expense

Calculating stock-based compensation expense requires the input of highly subjective assumptions, including the expected life of the options, stock price volatility, dividends and the pre-vesting option forfeiture rate. We estimate the expected life of options granted based on historical exercise patterns, which we believe are representative of future behavior. We estimate the volatility of our common stock on the date of grant based on our stock's market-based historical volatility. The assumptions used in calculating the fair value of stock-based awards represent our best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and we use different assumptions, our stock-based compensation expense could be materially different in the future. In addition, we are required to estimate the expected forfeiture rate and only recognize expense for those shares expected to vest. We estimate the forfeiture rate based on historical experience of our stock-based awards that are granted, exercised and canceled. If our actual forfeiture rate is materially different from our estimate, stock-based compensation expense could be significantly different from what we have recorded in the current period. See "Note 13 - *Stock-Based Compensation Expense*" of the Notes to Consolidated Financial Statements for additional detail.

Accounting for income taxes

We must make certain estimates and judgments in determining income tax expense for financial statement purposes. These estimates and judgments are used in the calculation of tax credits, tax benefits and deductions, and in the calculation of tax assets and liabilities. Significant changes to these estimates may result in an increase or decrease to our tax provision in a subsequent period.

We must assess the likelihood that we will be able to recover our deferred tax assets. If recovery is not likely on a more-likely-than-not basis, we must increase our provision for income taxes by recording a valuation allowance against our deferred tax assets. Should there be a change in our ability to recover our deferred tax assets, our provision for income taxes would fluctuate in the period of the change.

We account for uncertain tax positions in accordance with authoritative guidance related to income taxes. The calculation of our unrecognized tax benefits involves dealing with uncertainties in the application of complex tax regulations. As such, we are required to make many subjective assumptions and judgments regarding our income tax exposures. We record unrecognized tax benefits for anticipated tax audit issues in the U.S. and other tax jurisdictions based on our estimate of whether, and the extent to which, additional tax liabilities are more-likely-than-not assuming the tax authorities have full knowledge of all relevant information. If we ultimately determine that the tax liabilities are unnecessary, we reverse the liabilities and recognize a tax benefit during the period in which it occurs. This may occur for a variety of reasons, such as the expiration of the statute of limitations on a particular tax return or the completion of an examination by the relevant tax authority. We record an additional charge in our provision for taxes in the period in which we determine that the recorded unrecognized tax benefits are less than the expected ultimate settlement.

Our policy is to classify accrued interest and penalties related to the accrued liability for unrecognized tax benefits in the provision for income taxes. For the years ended December 31, 2019, 2018 and 2017, we did not recognize any significant penalties or interest related to unrecognized tax benefits. See "Note 14 - *Income Taxes*" of the Notes to Consolidated Financial Statements for additional detail.

Recent Accounting Pronouncements

See "Note 3 – *Recent Accounting Pronouncements*" of the Notes to Consolidated Financial Statements for a full description of recent accounting pronouncements including the respective expected dates of adoption.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The primary objectives of our investment activities are to preserve principal and maintain liquidity while at the same time capturing a market rate of return. To achieve these objectives, we maintain our portfolio of cash, cash equivalents and investments in a variety of securities, which are subject to risks including:

Interest Rate Risk

Our interest rate risk relates primarily to interest expense on our debt and interest income from investments. As of December 31, 2019, a one percentage point change in interest rates on our debt throughout a one-year period would have an annual effect of approximately $3.4 million on our income before income taxes. Our interest income is sensitive to changes in the general level of US interest rates, particularly since a significant portion of our investments were, and may in the future be, in short-term marketable securities, U.S. government securities and corporate bonds. As of December 31, 2019, a one percentage point change in interest rates for our cash and investments throughout a one-year period would have an annual effect of approximately $1.0 million on our income before income taxes.

Investment Risk

We are exposed to market risk as it relates to changes in the market value of our investments in addition to the liquidity and credit worthiness of the underlying issuers of our investments. In the third quarter of 2018, we purchased equity of Onkyo Corporation, a publicly traded company listed on the JASDAQ market of the Tokyo Stock Exchange, which further subjects us to significant risks associated with individual securities. Our investments are subject to fluctuations in fair value due to the volatility of the credit markets and prevailing interest rates for such securities. Our marketable debt securities, consisting primarily of municipal bonds and notes, corporate bonds and notes, commercial paper, treasury and agency notes and bills and certificates of deposit, are classified as available-for-sale securities with fair values of $45.8 million and $37.3 million as of December 31, 2019 and 2018, respectively. Unrealized losses, net of tax, on these investments were approximately $0.1 million and $0.3 million as of December 31, 2019 and 2018, respectively. In addition, unrealized loss on the Onkyo equity investment, which was recognized in other income and expense, net, on our Consolidated Statement of Operations, amounted to $2.3 million through December 31, 2019. We did not hold any derivatives, derivative commodity instruments or other similar financial instruments in our portfolio as of December 31, 2019.

Bank Liquidity Risk

As of December 31, 2019, we have approximately $72.0 million of cash in operating accounts that are held with both domestic and international financial institutions, the majority held with domestic financial institutions. These cash balances could be lost or become inaccessible if the underlying financial institutions fail or if they are unable to meet the liquidity requirements of their depositors and they are not supported by the federal government. We have not incurred any losses and have had full access to our operating accounts to date. We believe any failures of domestic and international financial institutions could impact our ability to fund our operations in the short term.

Exchange Rate Risk

During the year ended December 31, 2019, we derived approximately 74% of our revenue from sales outside the U.S. and we maintain research and development, sales, marketing, and business development offices in many foreign countries. Our results could be negatively affected by factors such as changes in foreign currency exchange rates, trade protection measures, longer accounts receivable collection patterns, and changes in regional or worldwide economic or political conditions. The risks from our international operations are mitigated in part by the extent to which our revenue is denominated in US dollars and, accordingly, we are not exposed to significant foreign currency risk on these items. Revenue denominated in foreign currencies was not material during 2019. On the other hand, we have a greater amount of foreign currency risk on certain operating expenses such as salaries and overhead costs of our foreign operations and cash maintained by these operations. In 2019, approximately $44.5 million of operating expenses for our foreign subsidiaries were denominated in foreign currencies; as such a 10% fluctuation in exchange rates would impact our business by approximately $4.5 million.

Our international business is subject to risks, including, but not limited to, differing economic conditions, changes in political climate, differing tax structures, other regulations and restrictions, and foreign exchange rate volatility when compared to the U.S. dollar. Accordingly, our future results could be materially impacted by changes in these or other factors.

We are also affected by exchange rate fluctuations as the financial statements of our foreign subsidiaries are translated into U.S. dollars in consolidation. As exchange rates vary, these results, when translated, may vary from expectations and could adversely or positively impact overall profitability. During 2019, the impact of foreign exchange rate fluctuations related to translation of our foreign subsidiaries' financial statements was immaterial to our consolidated financial statements.

Item 8. Financial Statements and Supplementary Data

Our consolidated balance sheets as of December 31, 2019 and 2018, and the related consolidated statements of operations, equity, comprehensive loss and cash flows for each of the years in the three-year period ended December 31, 2019 are set forth in this Annual Report at Item 15(a)(1).

SELECTED QUARTERLY FINANCIAL INFORMATION (UNAUDITED)

The following table presents our unaudited quarterly results of operations for the eight quarters in the periods ended December 31, 2019 and 2018.

The following table should be read in conjunction with the consolidated financial statements and related notes contained elsewhere in this Annual Report. We have prepared the unaudited information on the same basis as our audited consolidated financial statements. This table includes all adjustments, consisting only of normal recurring adjustments, that we consider necessary for fair statement of our financial position and operating results for the quarters presented. Operating results for any quarter are not necessarily indicative of results for any future quarters or for a full year. We employ a calendar month-end reporting period for our quarterly reporting.

	Three Months Ended (1)							
	Mar 31, 2018	Jun 30, 2018	Sep 30, 2018	Dec 31, 2018	Mar 31, 2019	Jun 30, 2019	Sep 30, 2019	Dec 31, 2019
	(in thousands, except per share amounts)							
Revenue:								
Royalty and license fees	$ 65,532	$ 63,954	$ 72,365	$ 204,282	$ 56,567	$ 75,115	$ 57,867	$ 90,518
Total Revenue	65,532	63,954	72,365	204,282	56,567	75,115	57,867	90,518
Operating expenses:								
Cost of revenue	2,324	2,080	5,003	3,884	2,207	2,529	1,505	2,219
Research, development and other related costs	26,515	25,170	24,189	30,532	27,039	25,704	26,369	33,233
Selling, general and administrative	34,702	30,476	28,084	34,645	30,569	28,653	28,847	34,828
Amortization expense	27,166	27,199	27,208	26,877	25,459	25,314	25,146	24,027
Litigation expense	7,316	6,635	7,642	4,506	1,290	1,231	1,527	1,079
Total operating expenses	98,023	91,560	92,126	100,444	86,564	83,431	83,394	95,386
Operating income (loss)	(32,491)	(27,606)	(19,761)	103,838	(29,997)	(8,316)	(25,527)	(4,868)
Interest expense	(6,318)	(6,200)	(6,343)	(6,804)	(6,685)	(6,199)	(5,506)	(4,987)
Other income and expense, net	3,154	2,229	1,737	1,475	2,302	4,806	429	1,491
Income (loss) before taxes	(35,655)	(31,577)	(24,367)	98,509	(34,380)	(9,709)	(30,604)	(8,364)
Provision for (benefit from) income taxes	(2,638)	(3,321)	(2,591)	17,223	(8,950)	(3,547)	(14,583)	8,056
Net income (loss)	$ (33,017)	$ (28,256)	$ (21,776)	$ 81,286	$ (25,430)	$ (6,162)	$ (16,021)	$ (16,420)
Less: Net income (loss) attributable to noncontrolling interest	—	—	—	(1,474)	(347)	(341)	(407)	(408)
Net income (loss) attributable to Xperi	$ (33,017)	$ (28,256)	$ (21,776)	$ 82,760	$ (25,083)	$ (5,821)	$ (15,614)	$ (16,012)
Income (loss) per share attributable to Xperi:								
Basic	$ (0.67)	$ (0.58)	$ (0.44)	$ 1.71	$ (0.51)	$ (0.12)	$ (0.32)	$ (0.32)
Diluted	$ (0.67)	$ (0.58)	$ (0.44)	$ 1.70	$ (0.51)	$ (0.12)	$ (0.32)	$ (0.32)
Weighted average number of shares used in per share calculations-basic	49,302	49,060	48,958	48,445	48,721	49,259	49,459	49,566
Weighted average number of shares used in per share calculations-diluted	49,302	49,060	48,958	48,559	48,721	49,259	49,459	49,566

(1) The sum of quarterly amounts, including per share amounts, may not equal amounts reported for year-to-date periods. This is due to the effects of rounding and changes in the number of weighted-average shares outstanding for each period.

Other Supplementary Data

The following tables present our quarterly unaudited non-GAAP financial measures for the eight quarters in the periods ended December 31, 2019 and 2018. The non-GAAP financial measures adjust for non-cash acquired intangibles, amortization charges, merger-related costs, all forms of stock-based compensation expense, restructuring, impairment of long-lived assets, interest income from significant financing components under Topic 606 and realized and unrealized gains or losses on marketable equity securities. We believe that the non-GAAP measures used in this report provide investors with important perspectives into our ongoing business performance. Our management uses these non-GAAP financial measures when evaluating our operating performance. The non-GAAP financial measures disclosed by us should not be considered a substitute for, or superior to, financial measures calculated in accordance with GAAP, and the financial results calculated in accordance with GAAP and reconciliations to those financial statements should be carefully evaluated. The non-GAAP financial measures used by us may be calculated differently from, and therefore may not be comparable to, similarly titled measures used by other companies.

	Three Months Ended							
	Mar 31, 2018	**Jun 30, 2018**	**Sep 30, 2018**	**Dec 31, 2018**	**Mar 31, 2019**	**Jun 30, 2019**	**Sep 30, 2019**	**Dec 31, 2019**
	(in thousands)							
GAAP operating expenses	$ 98,023	$ 91,560	$ 92,126	$ 100,444	$ 86,564	$ 83,431	$ 83,394	$ 95,386
Adjustments to non-GAAP operating expenses:								
Stock-based compensation expense:								
Research, development and other related costs	(3,094)	(3,344)	(3,252)	(3,478)	(3,603)	(3,146)	(3,544)	(4,350)
Selling, general and administrative	(4,314)	(3,875)	(4,201)	(5,453)	(4,020)	(4,075)	(4,444)	(4,372)
Amortization of acquired intangibles	(27,166)	(27,199)	(27,208)	(26,877)	(25,459)	(25,314)	(25,146)	(24,027)
M&A transaction costs	—	—	—	—	—	—	—	(4,636)
Post acquisition retention bonus to DTS employees:								
Research, development and other related costs	(41)	(18)	—	—	—	—	—	—
Selling, general and administrative	(1,439)	(1,013)	—	—	—	—	—	—
Non-GAAP operating expenses	$ 61,969	$ 56,111	$ 57,465	$ 64,636	$ 53,482	$ 50,896	$ 50,260	$ 58,001

	Three Months Ended							
	Mar 31, 2018	**Jun 30, 2018**	**Sep 30, 2018**	**Dec 31, 2018**	**Mar 31, 2019**	**Jun 30, 2019**	**Sep 30, 2019**	**Dec 31, 2019**
	(in thousands)							
GAAP other income and expense, net	$ 3,154	$ 2,229	$ 1,737	$ 1,475	$ 2,302	$ 4,806	$ 429	$ 1,491
Adjustments to non-GAAP other income and expense, net:								
Interest income from significant financing components under Topic 606	(2,151)	(2,148)	(1,576)	(1,797)	(1,866)	(1,854)	(906)	(1,136)
Realized and unrealized loss (gain) on marketable equity securities	—	—	566	1,651	410	(2,032)	1,060	552
Non-GAAP other income and expense, net	$ 1,003	$ 81	$ 727	$ 1,329	$ 846	$ 920	$ 583	$ 907

Additional Financial Data

The following table presents our total billings (in thousands):

	Three Months Ended							
	Mar 31, 2018	**Jun 30, 2018**	**Sep 30, 2018**	**Dec 31, 2018**	**Mar 31, 2019**	**Jun 30, 2019**	**Sep 30, 2019**	**Dec 31, 2019**
Total Billings	$ 104,268	$ 100,694	$ 100,587	$ 141,798	$ 104,302	$ 92,302	$ 90,629	$ 126,688

We define billings as amounts in an accounting period invoiced to customers, less any credits issued to or paid to customers, plus amounts due under certain licensing-related contractual arrangements that may not be subject to an invoice. Management evaluates the Company's financial performance in part based on billings due to the close alignment between billings and cash receipts from licensing activity, and believes billings is an important metric to provide to readers of our financial results. Billings may vary materially from revenue recorded under U.S. GAAP.

The following table presents our cash tax payments (in thousands):

	Three Months Ended							
	Mar 31, 2018	Jun 30, 2018	Sep 30, 2018	Dec 31, 2018	Mar 31, 2019	Jun 30, 2019	Sep 30, 2019	Dec 31, 2019
Cash Tax Payments	$ 3,963	$ 4,343	$ 4,462	$ 10,911	$ 5,599	$ 858	$ 5,917	$ 2,627

Cash tax payments are defined as total income taxes paid, net of refunds, and are derived from supplemental cash flow disclosure information appearing on the Consolidated Statements of Cash Flows.

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

Not applicable.

Item 9A. Controls and Procedures

Attached as exhibits to this Form 10-K are certifications of Xperi Corporation's Chief Executive Officer and Chief Financial Officer, which are required in accordance with Rules 13a-15(e) and 15d-15(e) of the Exchange Act. This "Controls and Procedures" section includes information concerning the controls and controls evaluation referred to in the certifications and it should be read in conjunction with the certifications, for a more complete understanding of the topics presented.

Evaluation of Controls and Procedures

Xperi Corporation maintains disclosure controls and procedures that are designed to ensure information required to be disclosed in our reports filed pursuant to the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow for timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act as of the end of the period covered by this report (the evaluation date). Based on this evaluation, our principal executive officer and principal financial officer concluded as of the evaluation date that our disclosure controls and procedures were effective to provide reasonable assurance that the information relating to Xperi Corporation, including our consolidated subsidiaries, required to be disclosed in our SEC reports (i) is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and (ii) is accumulated and communicated to Xperi Corporation's management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Change in Internal Control over Financial Reporting

There has been no change in Xperi Corporation's internal control over financial reporting, as defined in Exchange Act Rules 13a-15(f) and 15d-15(f), during Xperi Corporation's most recent quarter that has materially affected, or is reasonably likely to materially affect, Xperi Corporation's internal control over financial reporting.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for Xperi Corporation. Our 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 U.S. generally accepted accounting principles. Xperi Corporation's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of Xperi Corporation; (ii) 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 Xperi Corporation are being made only in accordance with authorizations of management and directors of Xperi Corporation; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of Xperi Corporation's assets that could have a material effect on the financial statements.

Xperi Corporation's management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019, utilizing the criteria set forth in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework. Based on the assessment by Xperi Corporation's management, we determined that Xperi Corporation's internal control over financial reporting was effective as of December 31, 2019. The effectiveness of Xperi Corporation's internal control over financial reporting as of December 31, 2019 has been audited by PricewaterhouseCoopers LLP, Xperi Corporation's independent registered public accounting firm, as stated in their attestation report which appears on page F-1 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information About Our Board of Directors

Set forth below are the name, age and position of each member of our board of directors.

Name	Age	Position(s)
Darcy Antonellis	57	Director
David C. Habiger	51	Director
Richard S. Hill	68	Chairman of the Board of Directors
Jon E. Kirchner	52	Chief Executive Officer and Director
V. Sue Molina	71	Director
George A. Riedel	62	Director
Christopher A. Seams	57	Director

The following are biographical summaries of our board members.

Darcy Antonellis has served on the Board since December 2018. Since January 2014, Ms. Antonellis has been the Chief Executive Officer of Vubiquity, Inc., a wholly owned subsidiary of Amdocs Limited since February 22, 2018, the largest global provider of premium content services and technical solutions serving clients in 120 countries and in 80 languages. From June 1998 until December 2013, Ms. Antonellis held numerous positions at Warner Bros. Entertainment Inc., a Time Warner company, including President, Technical Operations and Chief Technology Officer. Ms. Antonellis has also served as a member of the Board of Directors of Cinemark Holdings, Inc. since July 7, 2015. Ms, Antonellis received a B.S. in electrical engineering from Temple University and an M.B.A. from Fordham University. The Board believes Ms. Antonellis brings her extensive expertise in executive management, operations and engineering and her in-depth understanding of content services, media and entertainment industry to her role as a member of the Board.

David C. Habiger has served on the Board since December 2016. Mr. Habiger currently serves as the Chief Executive Officer of JD Power, a privately held company. Mr. Habiger served as a director of DTS from March 2014 until its acquisition by the Company in December 2016. Mr. Habiger serves as a director of the Chicago Federal Reserve Board. He is on the SABOR (Systems Activities, Bank Operations and Risk) Committee and the Governance & HR Committee for the Federal Reserve. Mr. Habiger served as the CEO at Textura Corporation, a software company focused on construction management, from May 2015 until its sale to Oracle in June 2016. From May 2011 to August 2012, he served as the Chief Executive Officer of NDS Group Ltd., a provider of video software and content security solutions. Mr. Habiger worked with the founding members of Sonic Solutions ("Sonic"), a computer software company, from 1992 to 2011 and served as President and Chief Executive Officer of Sonic from 2005 to 2011. He serves as a director for Echo Global Logistics, Inc., GrubHub Inc., and Stamps.com Inc., and previously served as a director for Control4 Corporation, Enova International, Inc., Immersion Corporation, RealD Inc., Textura Corporation, DTS, and Sonic Solutions. He is a member of the National Association of Corporate Directors and is on the Advisory Board of the University of Chicago Center for Entrepreneurship. Mr. Habiger received a bachelor's degree in business administration from St. Norbert College and an M.B.A. from the University of Chicago. The Board believes that Mr. Habiger brings extensive experience in the digital media and entertainment industries and his in-depth knowledge and understanding of the consumer electronics industry to his role as a member of the Board.

Richard S. Hill has served as a member of the Board since August 2012 and as Chairman of the Board since March 2013. Mr. Hill also served as the Company's Interim Chief Executive Officer from April 15, 2013 until May 29, 2013. Mr. Hill previously served as the Chief Executive Officer and member of the board of directors of Novellus Systems Inc., until its acquisition by Lam Research Corporation in June 2012. During his nearly 20 years leading Novellus Systems, a designer, manufacturer, and marketer of semiconductor equipment used in fabricating integrated circuits, Mr. Hill grew annual revenues from approximately $100 million to over $1 billion. Presently, Mr. Hill is Chairman of Marvell Technology Group Ltd. ("Marvell"), a producer of storage, communications and consumer semiconductor products, and a member of its board of directors. Mr. Hill served as Interim Chief Executive Officer of Marvell from May 2016 until July 2016. Mr. Hill is a member of the boards of directors of Arrow Electronics, Inc., a global provider of products and services to industrial and commercial users of electronic components and enterprise computing, and Cabot Microelectronics Corporation, the leading global supplier of chemical mechanical planarization (CMP) slurries and a growing CMP pad supplier to the semiconductor industry. Mr. Hill previously served on the board of directors of Symantec Corporation, LSI Corporation, Planar Systems, Autodesk, Inc. and Yahoo Inc. Mr. Hill received a B.S. in Bioengineering from the University of Illinois in Chicago and an M.B.A. from Syracuse University. The Board believes that Mr. Hill brings extensive expertise in executive management and engineering for technology and defense-related companies to his role as Chairman of the Board.

Jon E. Kirchner has served on the Board and as Chief Executive Officer since June 2017. Previously he was president of Xperi following the completion of the acquisition of DTS in December 2016. He served as DTS's Chairman of the board of directors and Chief Executive Officer from 2010 to December 2016 and had been a member of DTS's board of directors from 2002 to December 2016. From 2001 to 2010, he served as DTS's Chief Executive Officer. Prior to his tenure as Chief Executive Officer, Mr. Kirchner served at DTS from 1993 to 2001 in a number of senior leadership roles including President, Chief Operating Officer and Chief Financial Officer. Prior to joining DTS, Mr. Kirchner worked for the consulting and audit groups at Price Waterhouse LLP (now PricewaterhouseCoopers LLP), an international accounting firm. In 2012, Mr. Kirchner received the Ernst & Young Technology Entrepreneur of the Year Award for Greater Los Angeles. In 2011, Mr. Kirchner was honored by the Producers Guild of America, receiving the "Digital 25: Leaders in Emerging Entertainment" award for being among the visionaries that have made significant contributions to the advancement of digital entertainment and storytelling. Mr. Kirchner currently serves on the board of directors of Free Stream Media Corporation (Samba TV), a leader in developing cross platform TV experiences for consumers and advertisers. Mr. Kirchner is a Certified Public Accountant and received a B.A. in Economics, cum laude, from Claremont McKenna College. The Board believes that Mr. Kirchner brings his experience in the senior management of public companies, including service as chairman, president, Chief Executive Officer, Chief Operating Officer and Chief Financial Officer, his extensive experience in the digital media and entertainment industries, as well as his knowledge of the Company as its Chief Executive Officer, to his role as a member of the Board.

V. Sue Molina has served on the Board since February 2018. Most recently she served on the Board of Directors of DTS from January 2008 until December 2016, and served as Chair of the Audit Committee and Nominating and Corporate Governance Committee. From November 1997 until her retirement in May 2004, Ms. Molina was a tax partner at Deloitte & Touche LLP, an international accounting firm, serving from 2000 until May 2004 as the national partner in charge of Deloitte's Initiative for the Retention and Advancement of Women. Prior to that, she spent twenty years with Ernst & Young LLP, an international accounting firm, the last ten years as a partner. Ms. Molina has prior board experience serving on the Board of Directors, chair of the Compensation Committee and member of the Audit Committee of Sucampo Pharmaceuticals, Inc., and on the Board of Directors, chair of the Audit Committee and a member of the Compensation Committee of Royal Neighbors of America. She received a B.S.B.A. and a Masters of Accounting degree from the University of Arizona. The Board believes that Ms. Molina brings her extensive accounting and financial expertise, her experience in advising boards and her past service on boards of public companies, to her role as a member of the Board.

George A. Riedel has served on the Board since May 2013. He also has served on the board of Cerner Corporation, a leading supplier of health care information technology solutions and tech-enabled services, since May 2019. Since January 2018, Mr. Riedel has been a Senior Lecturer at Harvard Business School. Prior to that, he was the Chairman of the Board of Montreal-based Accedian Networks, where he had served as a director since 2010. Until January 2017, Mr. Riedel also served as Chairman and CEO of Cloudmark, Inc., a private network security company. Mr. Riedel joined the board at Cloudmark in June 2013, became Chairman in January 2014 and CEO in December 2014. Mr. Riedel also served on the board of directors of PeerApp from 2011 until 2014 and on the board of directors of Blade Network Technologies from 2009 until its sale to IBM in 2010. In March 2006, Mr. Riedel joined Nortel Networks Corporation, a publicly-traded, multinational, telecommunications equipment manufacturer ("Nortel"), as part of the turnaround team as the Chief Strategy Officer. His role changed after Nortel initiated creditor protection under the respective restructuring regimes of Canada under the Companies' Creditors Arrangement Act, in the U.S. under the Bankruptcy Code, the United Kingdom under the Insolvency Act 1986, on January 14, 2009, and subsequently, Israel, to lead the sale/restructuring of various carrier and enterprise business units through a series of transactions to leading industry players such as Ericsson, Avaya and Ciena. Mr. Riedel led the efforts to create stand-alone business units, carve out the relevant P&L and balance sheet elements and assign patents to enable sales of the assets. In 2010, Mr. Riedel's role changed to President of Business Units and CSO as he took leadership of the effort to monetize the remaining 6,500 patents and applications patents as well as manage the P&L for several business units that were held for sale. The 2011 patent sale led to an unprecedented transaction of $4.5 billion to a consortium of Apple, Ericsson, RIM, Microsoft and EMC. Prior to Nortel, Mr. Riedel was the Vice President of Strategy and Corporate Development of Juniper Networks, Inc., a publicly-traded designer, developer and manufacturer of networking products, from 2003 until 2006. Previously, Mr. Riedel was also a Director at McKinsey & Company, a global management consulting firm, where he spent 15 years serving clients in the telecom and technology sectors in Asia and North America on a range of strategy and growth issues. Mr. Riedel received a B.S. with Distinction in Mechanical Engineering from the University of Virginia and his M.B.A. from Harvard Business School. Mr. Riedel holds a Stanford Directors' College certification based on completion of its corporate directors training. The Board believes that Mr. Riedel brings his experience from his direct involvement in the restructuring of Nortel, including the sale of Nortel's patent portfolio for $4.5 billion, as well as his knowledge of the technology industry and leadership experience, to his role as a member of the Board.

Christopher A. Seams has served on the Board since March 2013. Mr. Seams served as the Chief Executive Officer and a director of Deca Technologies Inc., a subsidiary of Cypress Semiconductor Corporation, a global semiconductor company, from May 2013 until August 2016. Mr. Seams previously was an Executive Vice President of Sales & Marketing at Cypress Semiconductor Corporation, from July 2005 until June 2013. He previously served as an Executive Vice President of Worldwide Manufacturing & Research and Development of Cypress Semiconductor Corporation. Mr. Seams joined Cypress in 1990 and held a variety of positions in process and assembly technology research and development and manufacturing operations. Prior to joining Cypress in 1990, he worked as a process development Engineer or Manager for Advanced Micro Devices and Philips Research Laboratories. Mr. Seams currently serves as the Chairman of the Board of Directors of Onto Innovation Inc. (formerly Nanometrics Inc.). Mr. Seams is a senior member of IEEE, a member of NACD and ACCD, served on the Engineering Advisory Council for Texas A&M University and was a board member of Joint Venture Silicon Valley. Mr. Seams received a B.S. in Electrical Engineering from Texas A&M University and a M.S. in Electrical and Computer Engineering from the University of Texas at Austin. Mr. Seams has a Professional Certificate in Advanced Computer Security from Stanford University. Mr. Seams also holds a National Association of Corporate Directors certification which was awarded to him based on NACD training and examination standards. The Board believes that Mr. Seams brings extensive management, sales and marketing, and engineering experience in the semiconductor industry to his role as a member of the Board.

Director Independence

The Board of Directors currently consists of seven (7) persons. Mr. Kirchner is CEO of Xperi. Mr. Hill was interim CEO of Xperi's predecessor corporation for six weeks in 2013. Messrs. Habiger, Riedel and Seams and Mses. Antonellis and Molina are not, and have never been, employees of our Company or any of our subsidiaries.

The Board of Directors has determined that all of the Company's directors, other than Mr. Kirchner, are each "independent directors" as such term is defined in Nasdaq Marketplace Rule 5605(a)(2).

The Board of Directors has a standing Audit Committee, Compensation Committee and Nominating and Governance Committee. The Audit Committee has been established in accordance with Section 3(a)(58)(A) of the Exchange Act. Each of our Audit Committee, Compensation Committee and Nominating and Governance Committee is composed entirely of independent directors in accordance with current Nasdaq listing standards. Furthermore, each member of our Audit Committee meets the enhanced independence standards established by the Sarbanes-Oxley Act of 2002 and related rulemaking of the Securities and Exchange Commission (the "SEC"). The Board of Directors has further determined that, Ms. Sue Molina, Chair of the Audit Committee of the Board of Directors, is an "Audit Committee Financial Expert," as such term is defined in Item 407(d)(5) of Regulation S-K promulgated by the SEC, by virtue of her relevant experience listed in her biographical summary provided above. Copies of our Audit Committee, Nominating and Governance Committee and Compensation Committee charters and our corporate governance guidelines are available, free of charge, on our website at http://www.xperi.com. The Board of Directors from time to time constitutes such other committees as it deems appropriate to further the purposes of the Board.

Information About Our Executive Officers

Set forth below are the name, age and position of each of our executive officers.

Name	Age	Position(s)
Jon Kirchner	52	Chief Executive Officer, Director
Robert Andersen	56	Chief Financial Officer
Paul Davis	44	General Counsel and Corporate Secretary
Murali Dharan	58	President of Tessera Intellectual Property Corp.
Geir Skaaden	53	Chief Products and Services Officer

The following are biographical summaries of our executive officers other than Mr. Kirchner, for whom a biographical summary is set forth under "Information about Our Board of Directors."

Robert Andersen is executive vice president and chief financial officer of Xperi Corporation. He became executive vice president and chief financial officer of Xperi Corporation in January 2014. Prior to joining Xperi Corporation, he served as executive vice president and CFO of G2 Holdings Corp. d/b/a Components Direct. Mr. Andersen previously served as CFO at Phoenix Technologies Ltd. and held senior financial roles at Wind River Systems, Inc. and NextOffice, Inc. His finance career began at Hewlett-Packard Company, where he served in various controller, treasury and technology finance management roles. Mr. Andersen served on the board of directors of publicly traded Quantum Corporation through March 2017. He currently serves on the board of directors of the Alameda County Community Food Bank in the role of vice chair. Mr. Andersen holds a

B.A. in economics from the University of California, Davis, and an M.B.A. from the Anderson School of Management at the University of California, Los Angeles.

Paul Davis is general counsel and corporate secretary of Xperi Corporation. He joined Xperi Corporation in August 2011, and became general counsel and corporate secretary in July 2013. Before joining Xperi Corporation, he was an attorney at Skadden, Arps, Slate, Meagher & Flom LLP, where his practice focused on mergers and acquisitions, corporate securities matters and corporate governance. Mr. Davis holds a Juris Doctor from the University of California, Hastings College of the Law and B.A. degrees in history and political science from the University of California, San Diego. While at Hastings, he was magna cum laude, an Order of the Coif member and a managing editor on the Hastings Law Journal.

Murali Dharan has served as president of Tessera Intellectual Property Corp. ("Tessera") since October of 2017 and is responsible for the strategic direction, management and growth of the Tessera intellectual property licensing business. He has extensive leadership experience, most recently as CEO of IPVALUE, guiding the company from a start-up to an industry leader and helping partners to generate more than $1.6 billion in IP revenue. Prior to joining IPVALUE in 2002, Mr. Dharan held executive roles at various technology companies, including executive vice president at Preview Systems, vice president and general manager at Silicon Graphics, and vice president and general manager at NEC. Mr. Dharan holds an electrical engineering degree from Anna University in India, a master's degree in computer science from Indiana University, and an MBA from Stanford University.

Geir Skaaden has served as our chief products and services officer since December 2016 and leads global sales, business development and product management for our portfolio of imaging and audio solutions. He served as DTS's Executive Vice President, Products, Platforms and Solutions from October 2015 until its acquisition by the Company in December 2016, having previously served as DTS's Senior Vice President, Corporate Business Development, Digital Content and Media Solutions since December 2013. Prior to that, Mr. Skaaden served as DTS's Senior Vice President, Products & Platforms from April 2012 to December 2013. From 2008 to 2012, Mr. Skaaden served in a number of positions overseeing numerous aspects including strategic sales, licensing operations, and business development. Prior to joining DTS in 2008, Mr. Skaaden served as the Chief Executive Officer at Neural Audio Corporation from 2004 to 2008, where he previously served as Vice President, Corporate Development from 2002 to 2004. Mr. Skaaden holds a B.A. in Finance from the University of Oregon, a Business degree from the Norwegian School of Management and an M.B.A. from the University of Washington.

We have adopted a written code of business conduct and ethics that applies to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons serving similar functions. The text of our code of business conduct and ethics has been posted on our website at http://www.xperi.com. and is included as an exhibit to our Current Report on Form 8-K filed with the SEC on December 1, 2016.

Item 11. Executive Compensation

Compensation of Directors

We currently pay each of our non-employee directors an annual retainer of $50,000. We currently pay our non-executive Chairman an additional annual retainer of $50,000. In addition, we pay each of our non-employee directors the following annual retainers for their service as a member, or chair, as applicable, of our Board committees.

Annual Retainers for Committee Members:		
Audit Committee	$	12,000
Compensation Committee	$	8,000
Nominating and Governance Committee	$	6,000
Annual Retainers for Committee Chairs:		
Audit Committee	$	25,000
Compensation Committee	$	20,000
Nominating and Governance Committee	$	15,000

All Board and committee retainers are paid in equal quarterly installments over the course of each year of a director's service on the Board or applicable committee. We also reimburse all non-employee directors for reasonable expenses related to our Board or committee meetings.

Each of our non-employee directors receives restricted stock units and options to purchase shares of our common stock on the terms and conditions set forth in our stockholder-approved equity plan. A non-employee director receives a combination of options and/or restricted stock unit awards on the date of each annual meeting of our stockholders, as follows:

- The number of shares of common stock in the restricted stock unit award is determined by dividing (1) a dollar value to be paid in the form of restricted stock units ("Restricted Stock Unit Amount") by (2) the fair market value per share of our common stock on the date of grant.
- The number of shares that may be purchased pursuant to the option award is determined by dividing (1) a dollar amount to be paid in the form of option grants ("Option Amount") by (2) the quotient of (A) the fair market value per share of our common stock on the date of grant divided by (B) two (2).
- The total of the Restricted Stock Unit Amount plus the Option Amount received by each non-employee director at each annual meeting of stockholders is equal to $150,000. The Compensation Committee will determine the allocation between restricted stock units and option amounts annually.

A non-employee director who is initially appointed after any annual meeting of stockholders will receive a restricted stock unit award or option grant on the date of his or her initial appointment to the Board of Directors equal to the pro-rated amount of the annual grant.

Annual option grants and restricted stock unit awards (or any pro-rated grants for directors initially appointed between annual meetings) vest on the earlier to occur of the first anniversary of the date of grant or the next annual meeting of stockholders. No portion of an option automatically granted to a director is exercisable after the tenth anniversary after the date of option grant. Additionally, an option automatically granted to a director may be exercisable after the termination of the director's services as described in the option agreement, generally ending three months after such termination.

The following table shows compensation information for our non-employee directors for fiscal year 2019.

2019 Director Compensation Table

Name	Fees Earned or Paid in Cash ($)	Stock Awards ($)(1)	Option Awards ($)	Total($)
Richard S. Hill	$ 106,000	$ 149,987	—	$ 255,987
Darcy Antonellis	$ 55,333	$ 149,987	—	$ 205,320
David C. Habiger	$ 70,000	$ 149,987	—	$ 219,987
V. Sue Molina	$ 81,000	$ 149,987	—	$ 230,987
George A. Riedel	$ 68,333	$ 149,987	—	$ 218,320
Christopher A. Seams	$ 82,000	$ 149,987	—	$ 231,987

(1) The amounts reflected in this column represent the aggregate grant date fair value for stock awards granted to our non-employee directors in 2019, measured in accordance with ASC 718, excluding the effect of estimated forfeitures, and do not reflect whether the recipient has actually realized a financial benefit from these awards. For the methodology of how the aggregate grant date fair value amount is calculated, please see Note 13 of the Notes to Consolidated Financial Statements included in this Form 10-K. The aggregate number of shares subject to unvested restricted stock unit awards outstanding for each non-employee director at December 31, 2019 was: Mr. Hill: 5,889; Ms. Antonellis: 5,889; Mr. Habiger: 5,889; Ms. Molina: 5,889; Mr. Riedel: 5,889 and Mr. Seams: 5,889. None of the non-employee directors held any stock options as of December 31, 2019.

Executive Compensation and Related Information

Compensation Discussion And Analysis

Introduction

The following discussion and analysis contains statements regarding company performance targets and goals used in setting compensation for our named executive officers. These targets and goals are disclosed in the limited context of the Company's compensation programs and should not be understood to be statements of management's future expectations or estimates of future results or other guidance. The Company specifically cautions investors not to apply these statements to other contexts.

This Compensation Discussion and Analysis (CD&A) describes the Company's executive compensation philosophy, objectives and programs, as well as the compensation-related actions taken in 2019. Our named executive officers, or NEOs, for fiscal year 2019 are identified as follows:

- Jon Kirchner – Chief Executive Officer (CEO)
- Robert Andersen – Chief Financial Officer (CFO)
- Paul Davis – General Counsel & Corporate Secretary
- Murali Dharan – President, Tessera Intellectual Property Corporation (Tessera)
- Geir Skaaden – Chief Product and Services Officer

The titles above reflect positions held by the NEOs as of the end of 2019. These titles remain unchanged as of the date of this Form 10-K.

Compensation Philosophy and Guiding Principles

We have designed our executive compensation program to reward our executive officers, including the NEOs, to be in alignment with the overall strategic and financial performance of the Company with the ultimate goal of building long-term stockholder value. Our approach to short-term compensation is to pay for current results and strategic actions taken that are expected to translate into improved future financial performance. Combined with our emphasis on long-term equity compensation, we believe this approach appropriately motivates, rewards and retains our executives, while providing strong alignment with our shareholders. We hold our executives to stringent performance standards and, as a result, our executive compensation plans are designed to pay competitively if strategic and financial performance objectives are met and less so if variable pay metrics are missed. We construct our compensation packages to provide remuneration sufficient to attract, retain and motivate our executives to exert their best efforts in the highly competitive consumer electronics and intellectual property licensing environments in which we operate. We believe that competitive compensation packages consisting of a combination of base salaries, short-term performance-based cash incentives, and long-term incentives delivered in the form of equity compensation that is earned over a multi-year period enable us to attract top talent, satisfy our retention objectives and align the compensation of our executive officers with our performance and stockholder value creation.

The Compensation Committee periodically reviews and analyzes market trends and the prevalence of various compensation delivery vehicles and adjusts the design and operation of our executive compensation program from time to time as it deems necessary and appropriate. In designing and implementing the various components of our executive compensation program, the Compensation Committee considers market and industry practices, as well as the impact of our compensation program on our financial results. While the Compensation Committee considers all factors in its deliberations, it places no formal weighting on any one factor.

Our executive compensation program emphasizes performance-based compensation and the amount of compensation paid to our executive officers varies significantly based on overall strategic and financial performance.

2019 Executive & Compensation Highlights

For our fiscal year ended December 31, 2019, the key highlights of our executive compensation program included:

- *Shareholder Outreach During 2019; Response to 2019 Say on Pay Vote.* In May 2019, we held our annual say-on-pay vote. The compensation of our NEOs received support from approximately 40.8% of the votes cast on the say-on-pay proposal (excluding abstentions and broker non-votes). We were disappointed with the level of stockholder support for our 2019 say-on-pay vote. Following the 2019 annual meeting of stockholders, we sought to better understand the views of our stockholders and address their concerns. At the direction of the Compensation Committee we reached out to our largest stockholders constituting approximately 72% of our outstanding shares to request feedback on our governance profile and specifically our compensation structure. Members of our management team and Compensation Committee engaged with holders owning approximately 43% of our outstanding stock. During these sessions, we shared our plans to implement a new performance-based equity structure for all executives in early 2020. The responses to the proposed equity grant structure, which includes heavily weighted, multi-year performance targets, were favorable overall. Due to the pending merger announced in December 2019, we have postponed our annual executive compensation review until after the merger is complete, at which time we will conduct a full review against a new peer group that is appropriate for the new combined company. We will take our learnings and feedback from the 2019 stockholder sessions and apply them to our practices in 2020. In addition to our annual outreach, our CEO, CFO and investor relations officers meet frequently with stockholders and the investment community regarding our overall strategy and performance.

- *No Changes to CEO Compensation*. Our CEO's base salary and annual incentive target remained unchanged for 2019. There were no equity awards granted to Mr. Kirchner in 2019 in light of his promotional equity awards that were granted in connection with his appointment as CEO in 2017, which were intended by the Compensation Committee to represent his long-term incentive opportunities for the duration of the initial three-year term of his employment agreement as CEO. Thus, the Compensation Committee did not intend to, and did not in fact, grant Mr. Kirchner additional equity awards during that period. As illustrated in the graphic below, the annual total target compensation for our CEO in 2019 was heavily weighted towards at-risk pay incentives (comprised of annual cash incentive compensation and performance-based equity eligible to vest based on 2019 performance).

(1) The calculation in the graphic above includes the CEO annualized base salary, annual target bonus, and the grant date fair value of that portion of the time-based RSUs and performance-based RSUs that were eligible to vest during 2019 or to be earned based on 2019 performance at target.

- *Executive Pay Targeted at Competitive Market Levels*. The Compensation Committee believes that the current NEOs should be paid at competitive market levels and took steps to better align the target total direct compensation of certain of our NEOs with the market median. The Committee increased the base salaries for Messrs. Andersen, Davis and Skaaden by 4%, 6% and 6% respectively. The adjustments were to better align their target total cash compensation with market practice relative to our compensation peer group, as described below.
- *Annual Incentive Bonus Targets*. The annual cash incentive bonus target for Mr. Skaaden was changed from 65% to 75% of base salary. These changes were made by the Compensation Committee as mentioned above to better align his target total cash compensation with market practice relative to our compensation peer group, as described below.
- *Equity Award Grants.* In fiscal year 2019, we granted time-based restricted stock units to Messrs. Andersen, Davis, Dharan and Skaaden as part of our annual executive compensation review. No other equity awards were granted to our NEOs during 2019.
- *Pay-for-Performance – Annual Incentive Bonus Payments.* Our annual cash incentive program is structured to only pay when rigorous goals are achieved. We did not reach our target financial goals established for fiscal year 2019 and therefore bonuses were paid below target levels based on the fiscal year 2019 financial results and performance against our other corporate goals. Payouts to our NEOs were on average 56% of their target bonuses. Detail regarding the annual incentive bonus payments is provided in the Annual Performance-Based Cash Incentive Bonuses section.

Summary of Certain Executive Compensation Practices

We endeavor to maintain sound corporate governance standards consistent with our executive compensation policies and practices. During 2019, the following policies and practices were in effect:

WHAT WE DO	WHAT WE DON'T DO
✔ **Pay for Performance:** We link pay to performance and stockholder interests by heavily weighting total direct compensation to the achievement of strong financial performance and a balanced mix of performance metrics established in advance by the Compensation Committee.	✘ **No Tax Gross-Ups:** We do not provide tax gross-ups to our NEOs for excess parachute payments or other benefits.
✔ **Independent Compensation Advisor:** The Compensation Committee selects and engages its own independent advisor.	✘ **No "Single Trigger" Severance Payments:** We do not generally have "single trigger" severance payments payable solely on account of the occurrence of a change of control event.
✔ **Thoughtful Peer Group Analysis:** The Compensation Committee reviews external market data when making compensation decisions and annually reviews our peer group with its independent compensation consultant.	✘ **No Special Perquisites:** We do not provide special perquisites for executives, such as club memberships, supplemental executive retirement plans or supplemental executive health benefits.
✔ **Thorough Compensation Risk Assessment:** The Compensation Committee conducts an annual assessment of the Company's executive and broad- based compensation programs to ensure prudent risk management.	✘ **No Hedging in Company Securities:** Our employees, including our executives and directors are prohibited from engaging in any hedging transaction with respect to Company equity securities (vested or unvested).
✔ **Compensation Committee Independence and Experience:** The Compensation Committee is comprised solely of independent directors who have extensive experience.	✘ **No Pledging of Company Securities:** Our executives and directors are prohibited from pledging Company securities.
✔ **Stock Ownership Guidelines:** Executives and directors are subject to stock ownership guidelines equal to a multiple of their respective annual base salaries (3x for the CEO and 1x for other executives) or Board retainers (3x for directors).	✘ **No Guaranteed Bonuses:** We do not provide guaranteed minimum bonuses or uncapped incentives under our annual bonus plan.
✔ **"Clawback" Policy:** Our clawback policy provides that our Board of Directors may require the forfeiture, recovery or reimbursement of incentive compensation from an executive officer in the event the officer's wrongdoing later is determined by our Board of Directors to have resulted in a material negative restatement of the Company's financial results.	✘ **No Re-Pricing or Discounted Options / SARs:** We do not re-price underwater awards and do not provide discount stock options or stock appreciation rights. Further the Restated Plan prohibits repricing of stock options or stock appreciation rights without stockholder approval.
✔ **Negative Discretion:** The Compensation Committee has the right to exercise negative discretion over executive incentive plan payments.	✘ **No Dividends Paid or Accrued on Awards Prior to Vesting**

Compensation-Setting Process

The Compensation Committee has the primary authority to approve the compensation provided to our executive officers. Consistent with prior years for 2019, Compensia, a national compensation consulting firm, was retained by the Compensation Committee to assist it in the determination of the key elements of our executive compensation programs. Compensia reports to and is accountable to the Compensation Committee, and may not conduct any other work for us without the authorization of the Compensation Committee. Compensia did not provide any services to us in 2019 beyond its engagement as an advisor to the Compensation Committee on executive and Board compensation matters. After review and consultation with Compensia, the Compensation Committee has determined that Compensia is independent and there is no conflict of interest resulting from retaining Compensia currently or during the year ended December 31, 2019. In reaching these conclusions, the Compensation Committee considered the factors set forth in Exchange Act Rule 10C-1 and Nasdaq listing standards.

In 2019, Compensia provided advice to the Compensation Committee with respect to competitive practices and the amounts and nature of compensation paid to executive officers in similar organizations. Compensia also advised on, among other things, structuring our various compensation programs and determining the appropriate levels of base salary, bonus and other long-term incentive compensation payable to our executive officers.

To aid the Compensation Committee in making its compensation determinations, our CEO provides recommendations annually to the Compensation Committee regarding the compensation of all executive officers, excluding himself. Each NEO other than our CEO, in turn, participates in an annual performance review with our CEO to provide input about their contributions to our success for the period being assessed. The Compensation Committee gathers data on our CEO's performance through several channels, including qualitative and quantitative assessments of the Company's performance, discussions with other members of

the management team and discussions with other members of our Board of Directors. Each Compensation Committee meeting ordinarily includes an executive session without members of our management team present.

For purposes of our annual and long-term incentive compensation programs, corporate performance goals are established at the beginning of the year. The Company's annual financial plan is formulated by our executive management team and is submitted for review and approval by our Board of Directors. Our CEO, after discussions with the management team, then typically recommends a subset of these goals to the Compensation Committee as the corporate performance goals underlying our annual cash incentive bonus plan and performance-based equity awards. We believe that the achievement of these performance goals is based on the successful efforts and contributions of our NEOs. As described below, the Compensation Committee retains the authority under our annual cash incentive plan to authorize bonus payments to our NEOs that are less than the bonus payments that would otherwise be awarded based on our achievement of the performance goals established for the plan. The Compensation Committee also has the authority to make discretionary bonus awards to our NEOs, but it did not do so in 2019.

Setting Executive Compensation

The Compensation Committee reviews competitive compensation practices and the financial performance of comparable companies at least annually. This analysis provides the necessary background to the Compensation Committee to ensure that compensation opportunities for our executive officers are competitive with compensation practices among comparable companies and that actual compensation paid to our executive officers is appropriately aligned with our performance in the past year.

Each year Compensia works with the Compensation Committee to confirm one or more peer groups of companies to be used in the competitive assessment. The companies comprising the peer group are selected because the Compensation Committee, management and Compensia believe they are representative of the type of companies which we currently, and may in the future, compete with for executive talent. In selecting peer companies, we used a number of targeted criteria designed to reflect our unique business structure. Given the limited number of directly comparable companies from a business perspective, the criteria were expanded in some cases to include companies that the Compensation Committee considered to be a close fit in terms of business focus and/or with whom we might compete for executive talent. As a result, some companies may not satisfy all of the selection criteria. Our peer group is based on the following criteria:

- *Industry*: Companies in the semiconductor, semiconductor equipment, audio and imaging technology, IP licensing, and other technology hardware sectors.
- *Revenue*: Companies with revenues that were 0.5x to 2.0x our revenue and we also reviewed revenue as compared to our annual billings.
- *Market Capitalization*: For Companies with market capitalizations that reflect the differences in our business model as a technology licensing company, which would not be accurately reflected if we selected peer companies based solely on annual revenue. We selected companies with a market capitalization that was generally within a range of 0.3x to 3.0x our market capitalization.
- *Geographic Location*: Companies based in the U.S. with an emphasis on firms headquartered in the San Francisco Bay Area.

2019 PEER GROUP

Ambarella, Inc. (AMBA)
Box, Inc. (BOX)
Cabot Microelectronics Corporation (CCMP)
Dolby Laboratories (DLB)
FireEye Inc. (FEYE)
FormFactor, Inc. (FORM)
Inphi Corporation (IPHI)
Integrated Device Technology, Inc. (IDTI)
InterDigital, Inc. (IDCC)
j2 Global, Inc. (JCOM)
M/A-COM Technology Solutions Holdings, Inc. (MTSI)
MaxLinear, Inc. (MXL)
Monolithic Power Systems, Inc. (MPWR)
Plantronics Inc. (PLT)
Power Integrations, Inc. (POWI)
Rambus Inc. (RMBS)
Semtech Corporation (SMTC)
Silicon Laboratories (SLAB)
TiVo Inc. (TIVO)

The peer group was used in early 2019 for purposes of evaluating whether compensation adjustments for our NEOs for 2019 were appropriate. The peer group was unchanged from the peer group used for our NEOs for 2018. The details of our standings relative to our peer groups with respect to revenue and market capitalization are below:

	Annual Revenue:		Market Cap:	Market Cap per Employee:	Annual Revenue per Employee:	Number of Employees:
	Last 4Q ($MM) as of 1/14/19	A Public Company with Annual Revenue Between 0.5x to 2.0x Xperi	Between 0.3x and 3.0x Xperi	< $2.5 million	< $1 million	Between 185 and 750
Ambarella	$247	●	●	●	●	●
Box	$581	●	●	●	●	
Cabot Microelectronics	$590	●	●	●	●	
Dolby Laboratories	$1,172				●	
FireEye	$816			●	●	
FormFactor	$521	●	●	●	●	
Inphi	$294	●	●	●	●	●
Integrated Device Tech	$906				●	
InterDigital	$437	●	●			●
j2 Global	$1,178			●	●	
M/A-COM	$570	●	●	●	●	
MaxLinear	$411	●	●	●	●	
Monolithic Power Systems	$558	●			●	
Plantronics	$1,147		●	●	●	
Power Integrations	$431	●	●		●	●
Rambus	$265	●	●	●	●	
Semtech	$608	●		●	●	
Silicon Laboratories	$854				●	
TiVo	$742		●	●	●	

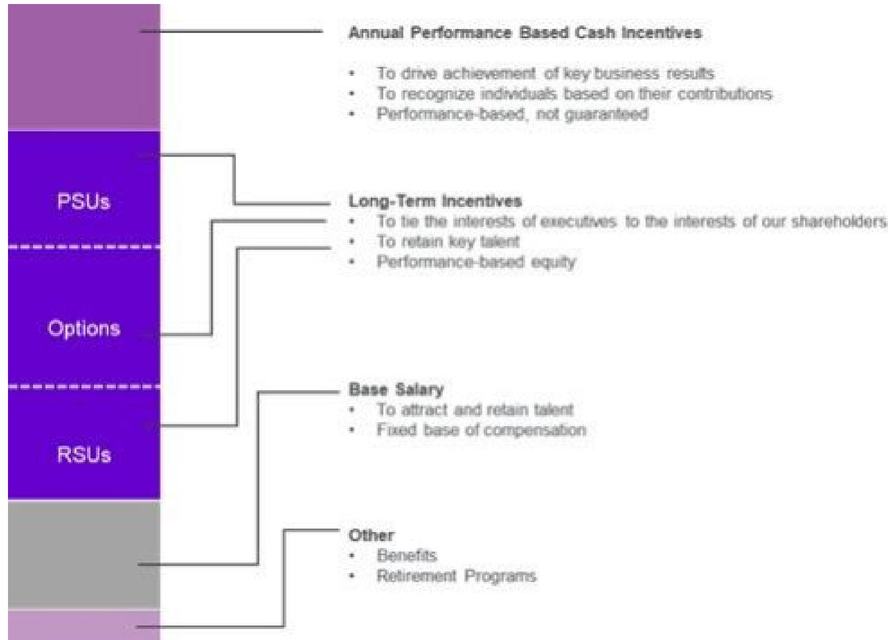
Each year, Compensia surveys the compensation practices of the peer group to assess the competitiveness of our compensation programs. Although we maintain the peer group for executive compensation and performance reference purposes, the peer group compensation data is limited to publicly available information and therefore does not necessarily provide comparisons for all officers. By contrast, survey data has the advantage of including data on executive positions beyond what is available in public filings, but may not be specific to the selected companies in the peer group. In light of this, in early 2019 the Compensation Committee also reviewed data from the Radford Executive Survey, which consists of approximately 600 companies throughout the United States primarily from technology industries. We look at multiple cuts of data from the surveys, including national data across industries, location data across industries and specific industry cuts, and within those industry and geographic groups we align revenues to be consistent with the peer group. With respect to the survey data presented to the Compensation Committee, the identities of the individual companies included in the survey were not provided to the Compensation Committee, and the Compensation Committee did not refer to individual compensation information for such companies.

We believe that by utilizing both publicly available peer group data and the survey data from the published surveys in which we participate, we are able to develop the best set of robust competitive data reasonably available for use in making compensation decisions. The Compensation Committee, when making compensation adjustments to the NEOs, reviews the publicly available peer group data and the survey data to ensure that, following any compensation adjustment, the total compensation of NEOs falls within the Company’s guidelines.

Based on the objectives outlined above, the Compensation Committee strives to set target total direct compensation opportunity levels at competitive levels for the markets in which we compete for executive talent and that are appropriate for the skills, experience and performance of each individual. However, the Compensation Committee does not establish compensation levels based solely on benchmarking. The Compensation Committee instead relies on the judgment of its members in making compensation decisions regarding base salaries, target bonus opportunity and long-term equity incentive awards after reviewing our performance and carefully evaluating each NEO’s performance during the year, leadership qualities, business responsibilities, career with the Company, current compensation arrangements and long-term potential to enhance stockholder value. The Compensation Committee does not guarantee that any NEO will receive a specific market-derived compensation level.

In addition, the Compensation Committee has taken the approach of determining the mix of compensation elements, such as base salary, target bonus opportunity and equity awards, on an individual basis. The Compensation Committee allocates target total direct compensation between cash and equity compensation based on a number of objective and subjective factors, including competitive practices among the comparable companies, the role and responsibilities of the individual executive, and the nature of the behaviors the incentives are intended to motivate. The Compensation Committee's philosophy is to balance compensation between long-term and short-term compensation, cash and non-cash compensation, and to take into account the roles and responsibilities of the individual executive.

Executive Compensation Components



The Compensation Committee oversees our executive compensation program. Our executive compensation program is designed to attract, motivate and retain talented executives that will drive our financial performance, growth and operational excellence objectives while creating long-term stockholder value. The Compensation Committee has established the following set of objectives for our executive compensation program:

- *Compensation should be market competitive*: Our compensation program is designed to provide competitive total compensation relative to the relevant labor markets for our NEOs while maintaining fiscal responsibility for our stockholders, allowing us to attract and retain individuals of appropriate ability and managerial talent;
- *Compensation should reward performance and support our business strategy*: A majority of our NEOs' total compensation opportunities is variable or dependent upon the achievement of key business results and is intended to link incentive award opportunities to the achievement of company and functional performance goals or appreciation in our stock price; and
- *Compensation should be aligned with stockholders' interests*: Our compensation program also seeks to reward our executive officers for increasing our stock price over the long-term and maximizing stockholder value by providing a significant portion of total compensation opportunities for our executive officers in the form of direct ownership in our company through long-term equity incentive awards.

The principal elements of our executive compensation program are base salary, annual cash incentive bonus awards and long-term incentive compensation in the form of equity awards. Base salary is intended to provide a baseline level of compensation for our NEOs. The remaining types of compensation, which in the aggregate represent the majority of our NEOs' total compensation opportunities, tie compensation directly to the achievement of corporate and/or functional objectives. Each element of our executive compensation program is discussed in greater detail below.

Base Salary

The base salary for each executive officer is initially established through negotiation at the time the executive is hired, taking into account the executive's qualifications, experience, competitive market data, overall compensation arrangements, internal equity and relevant survey data. In determining whether to make subsequent adjustments to the base salaries of our executive officers, the Compensation Committee reviews information regarding compensation paid to individuals holding comparable positions at our peer group companies as well as relevant market data from the applicable Radford Executive Compensation survey. In addition, each year the Compensation Committee determines whether to approve increases to our executive officers' base salaries based upon the Company's performance, their individual performance in accomplishing functional or team goals, changes in duties and responsibilities and the recommendations of our CEO (except with respect to his own base salary). No formulaic or guaranteed base salary increases are provided to the NEOs. In general, while the Compensation Committee does not attempt to set the various components of executive compensation at a certain target percentile within our peer group, executive base salaries fall generally between the 25th and 60th percentiles of the relevant comparable compensation data.

As part of the annual executive compensation review, on March 1, 2019, base salaries for Messrs. Andersen, Skaaden and Davis were increased to $380,000, $380,000 and $364,000, respectively.

The annual base salaries of the NEOs for 2019, were as follows:

Named Executive Officer	2019 Base Salary	2018 Base Salary	% Adjustment
Jon Kirchner	$ 600,000	$ 600,000	—
Robert Andersen	$ 380,000	$ 365,000	4%
Paul Davis	$ 364,000	$ 342,000	6%
Murali Dharan	$ 400,000	$ 400,000	—
Geir Skaaden	$ 380,000	$ 360,000	6%

The actual base salaries paid to the NEOs during 2019 are set forth in the "*2019 Summary Compensation Table*."

Annual Performance-Based Cash Incentive Bonuses

Our NEOs are eligible to receive an annual cash incentive bonus under our annual bonus plan, which we refer to as our MBO Plan.

Annual Cash Incentive Bonus Targets

At the beginning of each year, the Compensation Committee approves the target and maximum annual cash incentive bonus opportunities for each NEO in the MBO Plan. These target and maximum bonus opportunities are expressed as a percentage of base salary as follows:

Named Executive Officer	Target	Maximum
Jon Kirchner	100%	200%
Robert Andersen	75%	150%
Paul Davis	55%	110%
Murali Dharan	100%	200%
Geir Skaaden (1)	75%	150%

(1) As part of the annual executive compensation review, on March 1, 2019, the target bonus level for Mr. Skaaden was increased to 75%.

These target bonus levels are reviewed annually in consultation with Compensia as part of the compensation review process. Participants may receive a smaller award (or no award) if we do not achieve a target level of performance and a larger award (capped at a level that provides executives an opportunity to earn larger awards by exceeding performance objectives, but that does not create excessive risk by providing unlimited upside opportunities) if we exceed the target level of performance. Payments of above-target bonuses may be made only if we exceed our corporate financial objectives.

Performance Goals

Bonuses paid to our NEOs under our MBO Plan are based on our achievement of specific pre-established corporate performance goals and upon an evaluation of the individual officer's performance for their efforts tied to the corporate and strategic goals for the year. The Compensation Committee also selects one or more corporate performance goals applicable to the annual bonuses for that year and sets the target performance level for each such goal and a threshold performance level below which no annual bonus will be paid. Achievement levels up to 100% may be awarded for each corporate performance goal based on actual performance for the year relative to that goal. The corporate performance goals for 2019 were a combination of financial goals, innovation and key market penetration goals and operational excellence goals that are all directly supportive of our short-term and long-term strategic plans. The weighted goal categories for each NEO are set forth below.

	Financial Goals				
Named Executive Officer	**MBO Plan Billings Growth (1)**	**Non-GAAP Operating Profit (1)**	**Define, develop, market and successfully commercialize world class products and technologies**	**Secure multi- year recurring billing IP licensing agreements**	**Operational Excellence**
Jon Kirchner	60%	40%	—	—	—
Robert Andersen	60%	40%	—	—	—
Paul Davis	30%	30%	10%	20%	10%
Murali Dharan (2)	40%	30%	—	30%	—
Geir Skaaden	30%	30%	30%	—	10%

(1) MBO Plan Billings and non-GAAP operating profit are described below.
(2) For measuring Mr. Dharan's performance against financial goals, 40% was weighted on MBO Plan Billings from IP licensing and 30% was weighted on the full company non-GAAP operating profit.

Annual Performance Goals and Achievement

For purposes of the MBO Plan, the Compensation Committee set a threshold financial goal or "gate" that had to be achieved before any annual bonuses were paid. For purposes of the 2019 MBO Plan, this financial goal was for the Company to achieve positive non-GAAP operating profit for 2019 (the "Threshold Goal"). The Threshold Goal was achieved for 2019 and the actual bonuses for the NEOs were then determined based on the corporate goal achievement as described below.

For purposes of the 2019 MBO Plan, the threshold and target performance goals selected and set by the Compensation Committee (as well as the Company's actual results for each such goal) were as follows (with the achievement percentage for performance between threshold and target determined by linear interpolation):

	Financial Goals (1)	
Target	**Threshold**	**Achievement**
$441.7 million in total MBO Plan Billings (2)	$353.4 million in total MBO Plan Billings	93.7% achieved with $413.9 million in MBO Plan Billings
$207.3 million in non-GAAP operating profit (3)	$165.8 million in non-GAAP operating profit	97.1% achieved with $201.3 million in non-GAAP operating profit

Performance Goals

Target	Outcome
Goal: Define, develop, market and successfully commercialize world class products and technologies	
Drive new ecosystem creation and development across the business including IMAX Enhanced, DTS Connected Radio, FotoNation DMS and ZiBond/DBI. Accelerate ML development efforts across audio and imaging.	- Expanded the IMAX Enhanced ecosystem now available with 4 streaming services, 17 device manufacturers and in 14 countries. - Signed our first connected radio and our first occupancy monitoring licenses. - In mobile, we advanced our leadership position in gaming through the launch of Sound Unbound and continued to add motherboard, PC, mobile and gaming headset partners in this space. - Significantly progressed an initiative to develop an advanced machine learning hardware and software platform that we expect will drive meaningful future growth and expansion. - Completed the critical technology validation steps in 2019 to enable new hybrid bonding licenses including a new patent and technology license agreement with SK Hynix signed in early 2020.
Secure key license agreements and deepen strategic partnerships with at least 2 key customers; improve closing ratio of Salesforce opportunities by >15% in both deal volume and dollar value.	- Closed a strategic license agreement with a major European automotive manufacturer for occupancy monitoring systems. - Secured key licensing agreement with a global automotive manufacturer for launch and support of Connected Radio. - Improved the closing ratio of Salesforce opportunity pipeline by more than 20% in both deal volume and dollar value.
Goal: Secure multi-year recurring billing IP licensing agreements	
Continue to develop and acquire at least three, qualified IP assets in support of our ongoing semiconductor licensing strategy.	- Acquired high value semiconductor assets covering more than 150 patent families and greater than 450 patents to support long term strength of semiconductor patent portfolio.
Close at least one IP licensing agreement with multi-year revenue; add at least $40M of potential license value to our license pipeline.	- Closed one new IP license agreement of significant value from our IP pipeline. - We exceeded our pipeline development goals, with several engagements with new customers currently underway.
Goal: Operational Excellence	
Non-quantifiable goals for Messrs. Skaaden and Davis were established by our CEO. Overall performance against these objectives was assessed by the CEO at year-end.	- 100% achievement for Messrs. Davis and Skaaden.

(1) For measuring Mr. Dharan's performance against financial goals, the target performance level for MBO Plan Billings from IP licensing was set at $196.6 million. Billings for our IP business is calculated consistent with MBO Plan Billings as described in footnote (2) below.
(2) Billings for purposes of the MBO Plan (MBO Plan Billings) are the same as billings described under *Additional Financial Data* under Item 8. Financial Statements and Supplementary Data contained in this Form 10-K.
(3) For purposes of calculating non-GAAP operating profit, we use the calculation of MBO Plan Billings as described in footnote (2) above, and exclude stock-based compensation expenses, acquisition-related expenses and amortization of intangibles from our GAAP operating expenses. For further information regarding our non-GAAP operating expenses, please see *Other Supplementary Data* under Item 8. Financial Statements and Supplementary Data contained in this Form 10-K.

Multiplier

The bonuses to be paid to our NEOs who participated in the 2019 MBO Plan were able to be increased or decreased based on the matrix set forth below. The matrix ("2019 MBO Matrix") was structured as a combination of year over year MBO Plan Billings growth for the Company and annual non-GAAP operating profit achievement (expressed as a percentage of MBO Plan Billings). For 2019, year over year MBO Plan Billings were down by 7.5% and non-GAAP operating profit was 48.6% of MBO Plan Billings. Therefore, the multiplier for 2019 was 58.6% and the portion of bonuses tied to the financial metrics were multiplied by 58.6%. The maximum multiplier under the MBO Plan is 2.0. The Compensation Committee also has the right to exercise its discretion to reduce any bonus payment, but it did not choose to exercise that discretion with respect to the 2019 bonus payouts.

2019 MBO Matrix

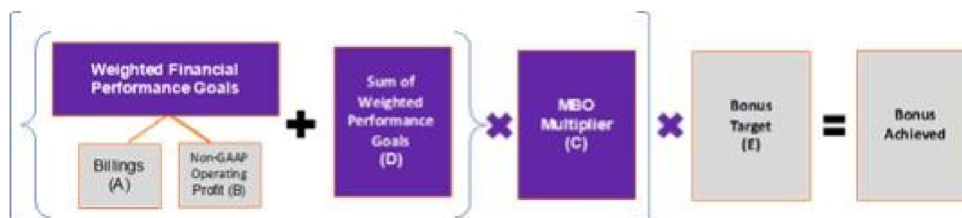
Billings Growth

Billings	Growth %															
581.6	30%	0.00	0.33	0.67	1.00	1.33	1.67	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
572.6	28%	0.00	0.32	0.63	0.95	1.27	1.58	1.90	1.91	1.93	1.94	1.96	1.97	1.99	2.00	2.00
563.7	26%	0.00	0.30	0.60	0.90	1.20	1.50	1.80	1.83	1.86	1.89	1.91	1.94	1.97	2.00	2.00
554.7	24%	0.00	0.28	0.57	0.85	1.13	1.42	1.70	1.74	1.79	1.83	1.87	1.91	1.96	2.00	2.00
545.8	22%	0.00	0.27	0.53	0.80	1.07	1.33	1.60	1.66	1.71	1.77	1.83	1.89	1.94	2.00	2.00
536.8	20%	0.00	0.25	0.50	0.75	1.00	1.25	1.50	1.57	1.64	1.71	1.79	1.86	1.93	2.00	2.00
527.9	18%	0.00	0.23	0.47	0.70	0.93	1.17	1.40	1.49	1.57	1.66	1.74	1.83	1.91	2.00	2.00
518.9	16%	0.00	0.22	0.43	0.65	0.87	1.08	1.30	1.39	1.47	1.56	1.64	1.73	1.81	1.90	1.99
510.0	14%	0.00	0.20	0.40	0.60	0.80	1.00	1.20	1.29	1.37	1.46	1.54	1.63	1.71	1.80	1.89
501.0	12%	0.00	0.18	0.37	0.55	0.73	0.92	1.10	1.19	1.27	1.36	1.44	1.53	1.61	1.70	1.79
492.1	10%	0.00	0.17	0.33	0.50	0.67	0.83	1.00	1.09	1.17	1.26	1.34	1.43	1.51	1.60	1.69
483.1	8%	0.00	0.16	0.32	0.48	0.63	0.79	0.95	1.03	1.11	1.19	1.26	1.34	1.42	1.50	1.58
474.2	6%	0.00	0.15	0.30	0.45	0.60	0.75	0.90	0.97	1.04	1.11	1.19	1.26	1.33	1.40	1.47
465.2	4%	0.00	0.14	0.28	0.43	0.57	0.71	0.85	0.91	0.98	1.04	1.11	1.17	1.24	1.30	1.36
456.3	2%	0.00	0.13	0.27	0.40	0.53	0.67	0.80	0.86	0.91	0.97	1.03	1.09	1.14	1.20	1.26
447.3	0%	0.00	0.09	0.18	0.28	0.37	0.46	0.55	0.63	0.71	0.79	0.86	0.94	1.02	1.10	1.18
438.4	-2%	0.00	0.08	0.17	0.25	0.33	0.42	0.50	0.57	0.64	0.71	0.79	0.86	0.93	1.00	1.07
429.5	-4%	0.00	0.08	0.15	0.23	0.30	0.38	0.45	0.51	0.58	0.64	0.71	0.77	0.84	0.90	0.96
420.5	-6%	0.00	0.07	0.13	0.20	0.27	0.33	0.40	0.46	0.51	0.57	0.63	0.69	0.74	0.80	0.86
411.6	-8%	0.00	0.06	0.12	0.18	0.23	0.29	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
402.6	-10%	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.34	0.39	0.43	0.47	0.51	0.56	0.60	0.64
	Company:	28%	30%	32%	34%	36%	38%	40%	42%	44%	46%	48%	50%	52%	54%	56%

Non-GAAP Operating Profit %

2019 Annual Cash Incentive Bonuses

Based on the above 2019 MBO Matrix, the annual cash incentive bonuses under the 2019 MBO Plan paid to Messrs. Kirchner, Andersen, Davis, Dharan and Skaaden were calculated as follows:



	Financial Goals			Performance Goals				
	Achievement of MBO Plan Billings Growth Goal (A) (1)	Company Achievement of Non-GAAP Operating Profit Goal (B) (2)	MBO Multiplier (C)	Define, develop, market and successfully commercialize world class products and technologies (D)	Secure multi-year recurring billing IP licensing agreements (D)	Operational Excellence Goals (D)	Bonus Target $ (E)	Bonus Achieved [(A+B+D)*C]*E
Jon Kirchner	56.2% of 60%	38.4% of 40%	58.6%	—	—	—	$ 600,000	$ 334,231
Robert Andersen	56.2% of 60%	38.4% of 40%	58.6%	—	—	—	$ 285,012	$ 158,766
Paul Davis	28.1% of 30%	29.3% of 30%	58.6%	9% of 10%	20% of 20%	10% of 10%	$ 200,204	$ 112,908
Murali Dharan	40% of 40%	29.3% of 30%	58.6%	—	30% of 30%	—	$ 400,000	$ 232,361
Geir Skaaden	28.1% of 30%	29.3% of 30%	58.6%	27% of 30%	—	10% of 10%	$ 285,012	$ 157,397

(1) Represents (a) 93.7% achievement relative to the full Company MBO Plan Billings objective (with $413.9 million in MBO Plan Billings), and (b) 100%% achievement relative to the IP business MBO Plan Billings objective (with $203.6 million in IP business MBO Plan Billings), which achievement results were weighted for the NEOs as described above. 100% is the maximum achievement level awarded under our MBO Plan above, provided that the MBO payment can exceed 100% as a result of the multiplier.
(2) Represents 97.1% achievement relative to the full Company non-GAAP operating profit goal (with $201.3 million in non-GAAP operating profit), which achievement results were weighted for the NEOs as described above. 100% is the maximum achievement level awarded under our MBO Plan, provided that the MBO payment can exceed 100% as a result of the multiplier.

Long-Term Compensation

Our long-term equity incentive compensation program is intended to provide our executive officers with opportunities to participate in the appreciation of our stock price and to create unvested equity award value that will provide a financial incentive for executives to remain with and work for the continued success of the organization. Our long-term equity incentive award program is generally comprised of three equity award vehicles, although the mix of such awards granted by the Compensation Committee to our NEOs varies from year to year based on the Compensation Committee's determinations regarding the appropriate incentives for such year:

- *Stock Option Awards*: Stock options form a basis of our long-term equity incentive award program. Stock options align the interests of management and stockholders by rewarding increases in stockholder value.
- *Restricted Stock Unit Awards (“RSU”)*: RSUs are used primarily in new hire executive packages and as part of our annual compensation review process. RSUs increase or decrease in value just as a traded share of common stock will, aligning executives’ interests with stockholders’ interest.
- *Performance-Based Restricted Stock Unit Awards*: Performance-based RSUs are provided to our CEO and select NEOs. These awards are earned upon the achievement of certain strategic pre-established milestones and / or specific annual financial goals and are intended to align a significant portion of these executives’ compensation to company performance.

Stock Option Awards

Generally, stock options have a four-year vesting schedule in order to provide an incentive for continued employment and expire ten years from the date of the grant, subject to earlier forfeiture in the event of termination of employment. This provides a reasonable time frame in which to align the executive officer with the price appreciation of our shares. The exercise price of stock options granted under the stock plans is 100% of the fair market value of the underlying common stock on the date of grant. Under our equity plan, the fair market value of our common stock is equal to the last closing sales price per share on the Nasdaq Global Select Market on the date of grant. Executives do not realize value from our stock options unless our stock price appreciates following the date of grant.

There were no stock option grants to our NEOs in 2019.

Time-Based Restricted Stock Unit Awards

We typically grant RSUs to selected new hires and other employees as part of the annual award program. The Compensation Committee believes that RSUs are an effective tool for adding an immediate financial incentive to remain with and work for us that will mitigate potential attempts by labor market competitors to recruit critical employees. In March 2019, as a result of our annual executive compensation review, the Compensation Committee granted Messrs. Andersen, Davis, Dharan and Skaaden awards for 63,550, 39,720, 39,720 and 39,720 RSUs, respectively. The foregoing RSUs have a four-year vesting schedule from the grant date in order to provide an incentive for continued employment. With respect to the RSU awards granted to our NEOs, the Compensation Committee determined the size of such awards by targeting the median level of our peer group.

Mr. Kirchner did not receive RSU grants in 2019 as a result of his previous grants received in 2017.

Performance-Based Restricted Stock Unit Awards

The Compensation Committee grants performance-based RSUs to selected new hires and, on certain occasions, as part of the annual award program. The Compensation Committee believes that performance-based RSUs are an important component of the NEOs’ compensation program and strives to establish an incentive award mix for our CEO and other NEOs that includes performance-based awards, as appropriate. Historically, the Compensation Committee has granted performance-based RSUs that are typically tied to a series of multi-year or annual performance measurement periods, with up to 200% of the “target” RSUs eligible to be earned at the “maximum” performance level. The performance objectives are generally to be determined by mutual agreement of the NEO and the Compensation Committee and vesting of such awards requires continued employment until the certification of the applicable performance requirements by the Compensation Committee. Any performance-based RSUs that do not vest in a given performance period will be forfeited.

The Compensation Committee believes that successive annual objectives are an effective incentive mechanism for the NEOs and our Company, as such a design allows the Compensation Committee to more carefully tailor the performance objectives and set rigorous goals to incentivize performance as we refine and evolve our strategic plan. This was particularly the case with the awards granted to Mr. Kirchner in 2017 given the Company's ongoing transformation following the acquisition of DTS and the formation of the long-term strategic plan. The annual objectives for 2019 for Mr. Kirchner were tied to the Company's financial goals in the 2019 MBO Plan. These profitability and growth objectives were used by the Compensation Committee for both annual bonus purposes and vesting of the performance-based RSUs for 2019 as they are measurements that our Compensation Committee believes to be critical since they are directly aligned with stockholder value creation.

The Compensation Committee also believes that performance-based RSUs with multiyear performance periods are another critical element of the compensation program since it allows for longer term goals and incentives. As described below, in 2017, Mr. Dharan was granted a performance-based RSU award tied to a three-year performance period.

No performance-based awards were granted to the NEOs during 2019. The performance-based RSUs granted to Messrs. Kirchner and Dharan during previous years but eligible to be earned based on 2019 performance, are described below. Messrs. Kirchner and Dharan were the only NEOs who held performance-based RSUs that were eligible to be earned based on 2019 performance.

The performance-based RSUs eligible to vest based on 2019 performance will be released in March 2020. The following table summarizes the performance-based RSUs granted to our NEOs that were eligible to vest during 2019 and the number of RSUs that ultimately vested based on 2019 performance, as described below:

NEO	Grant Date	Number of RSUs Available for Release at Target Based on 2019 performance	Number of RSUs Available for Release at Maximum Based on 2019 performance	Release Conditions	Performance Achieved	Shares Released
Jon Kirchner	3/1/17	8,750	17,500	Based on financial targets for MBO Plan Billings growth and non-GAAP operating profit in accordance with 2019 MBO multiplier matrix	58.6 %	5,128
	6/1/17	77,718	155,436	Based on financial targets for MBO Plan Billings growth and non-GAAP operating profit in accordance with 2019 MBO multiplier matrix	58.6 %	45,543
Murali Dharan	10/16/17	10,500	21,000	Based on four goals equally weighted in the following areas: Long-term IP strategy, completion of Invensas license and resolution of litigation, Expand the deal pipeline by >$40m, acquisition of high-quality IP assets, multi-year recurring IP licensing agreement and the addition of significant deal value for future years.	95.0 %	9,975

- *Mr. Kirchner*. Mr. Kirchner received two grants of performance-based RSUs in 2017, a portion of which were eligible to be earned based on 2019 performance. One of these awards was granted as part of our 2017 annual award process and his equity awards granted in June 2017 were made in connection with his appointment as CEO. The June 2017 awards, including the performance-based RSUs, were intended by the Compensation Committee to represent his long-term incentive opportunities for the duration of the initial three-year term of his employment agreement as CEO. Thus, the Compensation Committee did not intend to, and did not in fact, grant Mr. Kirchner additional equity awards during this period.

  At the time of grant, the Compensation Committee determined Mr. Kirchner's promotional awards by reference to the market median level for a new hire award and annual awards covering a total of three years in total target long-term incentive award value. The award was divided into 70% performance-based RSUs and 30% time-based RSUs. The Compensation Committee believed it was important to establish a long-term incentive award mix heavily weighted towards performance awards. The vesting of all of Mr. Kirchner's performance-based RSUs is tied to a series of four one-year performance measurement periods.

In March 2017, Mr. Kirchner received 35,000 “target” performance-based RSUs. Of these performance-based RSUs, 8,750 may vest each calendar year (commencing in 2017) at target performance and up to 17,500 may vest each year at maximum performance. These performance-based RSUs are eligible to be earned based on annual performance objectives to be determined as described above.

In June 2017, Mr. Kirchner also received 310,873 “target” performance-based RSUs in connection with his appointment as our Chief Executive Officer. Of these performance-based RSUs, 77,718 may be earned each calendar year (commencing in 2017) at the target performance level and up to 155,436 may be earned each year at maximum performance. These performance-based RSUs are eligible to be earned based on annual performance objectives to be determined as described above.

For each of these awards, the portion eligible to vest based on 2019 performance was tied to the Company’s financial goals for MBO Plan Billings growth and non-GAAP operating profit under the 2019 MBO Matrix, as described above.

- *Mr. Dharan*. In October 2017, in connection with his commencement of employment Mr. Dharan received 42,000 “target” performance-based RSUs. Of these performance-based RSUs, 10,500 may vest each calendar year (commencing in 2019) at target performance and up to 21,000 may vest each year at maximum performance. These performance-based RSUs will be eligible to be earned based on annual performance objectives to be determined as described above. The number of RSUs that actually vested with respect to this award is summarized in the table above. The portion of these awards eligible to vest based on 2019 performance was tied to the goals for Mr. Dharan.

  Mr. Dharan also received 60,000 performance-based RSUs that are eligible to vest based on achievement of deal performance goals over a three-year performance period. The deal performance goals are the closing of two new revenue opportunities, with 50% of the RSUs eligible for vesting upon achieving each of two deals. None of these deal performance-based RSUs vested during 2019.

Other Compensation

Employee Benefits

We maintain a Section 401(k) Savings/Retirement Plan (the “401(k) Plan”) to cover eligible employees of the Company and any designated affiliate in the United States. The 401(k) Plan permits eligible employees to defer up to the maximum dollar amount allowed by law. The employees’ elective deferrals are immediately vested and non-forfeitable upon contribution to the 401(k) Plan. We currently make discretionary matching contributions to the 401(k) Plan in an amount equal to 100% of deferrals up to a maximum of 4% of the participant’s eligible annual compensation and subject to certain other limits. Employer contributions to the Plan are vested as follows: 50% after one year of service, and 100% after two years of service.

Perquisites and Other Personal Benefits

Executive officers are eligible to participate in all of our employee benefit plans, such as medical, dental, vision, group life and disability insurance, in each case on the same basis as other employees, subject to applicable law. We also provide vacation and other paid holidays to all employees, including our executive officers. Other than as described in this section, we generally do not provide any special perquisites or health or welfare benefits to our NEOs that are not available to all of our employees.

Post-Employment Compensation Arrangements

We have entered into change in control severance agreements and severance agreements with our NEOs to provide appropriate post-employment compensation arrangements in the event of certain terminations of employment, including in connection with a change in control of the Company. The Compensation Committee believes these types of agreements are essential in order to attract and retain qualified executives and promote stability and continuity in our senior management team. We believe that the stability and continuity provided by these agreements are in the best interests of our stockholders. For details, see “Employment Contracts, Termination of Employment Arrangements and Change in Control Arrangements” below.

Stock Ownership Guidelines

We maintain stock ownership guidelines that apply to our CEO, each other executive officer of the Company within the meaning of Exchange Act Rule 16a-1(f) under the Securities Exchange Act of 1934, as amended, and each other employee that reports directly to our CEO (each, an "Executive"). Each Executive will be expected to own shares of common stock of the Company with a market value equal to the following amounts for as long as he or she remains an Executive:

Title	Ownership Threshold
Chief Executive Officer	Three times (3x) base salary
Other Executives	One times (1x) base salary

Each Executive must hold 50% of all "Net Settled Shares" (as defined below) received from the vesting, delivery or exercise of equity awards granted under our equity award plans until the Executive's ownership equals or exceeds the applicable ownership threshold, as set forth above. In no event shall shares of common stock purchased under our employee stock purchase plan be considered granted under our equity award plans for purposes of this share retention requirement. This share retention requirement applies to an Executive only if such Executive has not achieved his or her applicable ownership threshold. For purposes of the guidelines, "Net Settled Shares" means those shares of common stock that remain after payment of (a) the exercise price of stock options or purchase price of other awards and all applicable withholding taxes, including shares sold or netted with respect thereto, and (b) all applicable transaction costs.

Insider Trading Policy

Our insider trading policy prohibits directors, executive officers, employees and all persons living in their households from trading any type of security, whether issued by the Company or other companies with which we do business, while aware of material non-public information relating to the issuer of the security or from providing such material non-public information to any person who may trade while aware of such information. Additionally, we restrict trading by our directors and executive officers, as well as other categories of employees who may be expected in the ordinary course of performing their duties to have access to material non-public information, to quarterly trading windows that begin one full trading day following the public disclosure of our quarterly or annual financial results and that ends at 5:00 pm Eastern Time on the 15th day of the last month in each calendar quarter (or if the 15th day falls on a non-trading day, then on the trading day immediately prior to the 15th day of the last month in each calendar quarter). Furthermore, our insider trading policy requires that certain specified individuals meet with representatives of our legal department to confirm that they are not in possession of material non-public information prior to trading any security of the Company during open window periods. Our insider trading policy also prohibits directors, executive officers, employees and all persons living in their households from purchasing Company stock on margin, pledging Company stock to secure margin or other loans, short selling Company stock or buying or selling put or call options on Company stock, or entering into other derivative contracts or hedging contracts.

Clawback Policy

We have adopted an incentive compensation "clawback" policy under which the Compensation Committee or the Board of Directors may require the reimbursement or forfeiture of incentive compensation from an executive officer in the event of restatement of the company's financial results due to its material noncompliance with any financial reporting requirement under United States securities laws. We believe that by providing the Company with the appropriate power to recover incentive compensation paid to an executive officer in this situation, the Company demonstrates its commitment to strong corporate governance. Under our clawback policy, the Compensation Committee or the Board of Directors may require reimbursement from the executive officer for incentive compensation. The amount of incentive compensation that may be recovered is the portion of any bonus paid to, and any performance-based equity awards earned by, the executive officer that the executive officer would not have received if the Company's financial results had been reported properly. The right to cause a forfeiture or recovery of incentive compensation applies to incentive compensation during the three year period prior to the date on which the Company is required to prepare an accounting restatement.

Derivatives Trading and Hedging Policy

Our insider trading policy prohibits the pledging, trading of derivatives or the hedging of our equity securities by our employees, including our executive officers, and directors. Specifically, they may not, at any time:

- trade in any puts, calls, covered calls or other derivative products involving company securities;

- engage in any hedging or monetization transactions in a way that mitigates the full risk or rewards of ownership of the Company's securities; or
- hold company securities in a margin account or pledge company securities as collateral for a loan.

Compensation Risk Assessment

In early 2020, management assessed our compensation policies and programs for all employees for purposes of determining the relationship of such policies and programs and the enterprise risks faced by the Company and presented its assessment to our Compensation Committee. Based on its assessment, management recommended, and the Compensation Committee concluded, that none of our compensation policies or programs create risks that are reasonably likely to have a material adverse effect on the Company. In connection with their review, management and the Compensation Committee noted certain key attributes of our compensation policies and programs that help to reduce the likelihood of excessive risk taking, including:

- The program design provides a balanced mix of cash and equity compensation, fixed and variable compensation and annual and long-term incentives.
- Corporate performance objectives are designed to be consistent with the Company's overall business plan and strategy, as approved by the Board of Directors.
- The determination of executive incentive awards is based on a review of a variety of indicators of performance, including both financial and non-financial goals, reducing the risk associated with any single indicator of performance.
- Incentive payments are capped at no more than 200% of target.
- The Company's equity awards generally vest over four year periods or based upon the achievement of performance objectives.
- The Compensation Committee has the right to exercise negative discretion over executive incentive plan payments.

Tax and Accounting Considerations

Deduction Limitation

Section 162(m) of the Code generally disallows a tax deduction to a publicly-held company for compensation in excess of $1 million paid to its "covered employees." Prior to the Tax Cuts and Jobs Act of 2017 ("TCJA"), covered employees generally consisted of a company's chief executive officer and its three most highly compensated executive officers serving at the end of the taxable year (other than its chief financial officer), and compensation that qualified as "performance-based" under Section 162(m) was exempt from this $1 million deduction limitation. As part of the TCJA, the ability to rely on this exemption was, with certain limited exceptions, eliminated; in addition, the definition of covered employees was expanded to generally include all NEOs. Although we historically maintained plans that were intended to permit the payment of deductible compensation under Section 162(m) of the Code if the requirements of Section 162(m) were satisfied, subject to the limited transition relief rules in the TCJA, we may no longer be able to take a deduction for any compensation in excess of $1 million that is paid to a covered employee. While the Compensation Committee considers the tax deductibility of each element of executive compensation as a factor in our overall compensation program, the Compensation Committee retains the discretion to approve compensation that may not qualify for the compensation deduction.

We account for stock-based awards to our employees under the rules of FASB ASC Topic 718, which requires us to record the compensation expense over the service period of the award. Accounting rules also require us to record cash compensation as an expense at the time the obligation is accrued.

Employment Contracts, Termination of Employment Arrangements and Change of Control Arrangements

The Company provides for certain severance payments and benefits if an executive officer's employment is involuntarily or constructively terminated. In addition, the Company provides enhanced severance payments and benefits if such a termination of employment occurs in connection with a change in control of the Company. Such severance payments and benefits are designed to alleviate the financial impact of an involuntary termination of employment through salary, bonus and health benefit continuation and with the intent of providing for a stable work environment. The Company believes that reasonable severance payments and benefits for those NEOs with whom we have entered into severance agreements are important because it may be difficult for these NEOs to find comparable employment within a short period of time following certain qualifying terminations of employment. The Company also believes these payments and benefits are a means of reinforcing and encouraging the continued attention and dedication of key executives of the Company to their duties of employment without personal distraction or a conflict of interest in circumstances which could arise from the occurrence of a change in control of the Company. We believe that the interests of stockholders will be best served if the interests of our senior management are aligned with them, and providing change in control payments and benefits should eliminate, or at least reduce, the reluctance of senior management to pursue potential change in control transactions that may be in the best interests of stockholders.

The Company extends change in control payments and benefits because they are essential to help the Company fulfill its objectives of attracting and retaining key managerial talent. These arrangements are intended to be competitive within our industry and company size and are necessary to attract highly qualified individuals and encourage them to remain employed with the Company. In making the decision to extend the benefits, the Compensation Committee relied on the assurances of its independent advisor that the programs are representative of market practice, both in terms of design and cost.

Employment Agreement with Jon Kirchner

The Company entered into an employment and severance agreement with Mr. Kirchner (the "Employment Agreement") in connection with his appointment as our CEO. The Employment Agreement superseded his then-existing severance and change in control severance arrangements.

The Compensation Committee believes that the Employment Agreement provides the Company with reasonable contractual protections and that making severance commitments to the Company's CEO leads to stronger retention than if such payments and benefits were not offered.

The Employment Agreement provides the Company a balance of contractual protections in exchange for severance for Mr. Kirchner in the event of his termination of employment without cause and resignation for good reason, each as defined below. The Employment Agreement does not contain a single trigger provision that would generally allow him to terminate his employment because of a change of control of the Company, nor does it entitle him to payments and benefits under the Employment Agreement solely as a result of change of control of the Company. The Compensation Committee structured the Employment Agreement in this fashion because it believes he should not be eligible to such payments and benefits absent other factors, such as a termination of employment without cause or resignation for good reason.

The Employment Agreement provides that, if Mr. Kirchner's employment is terminated by the Company without cause or if he resigns for good reason, he will be entitled to receive the following severance payments and benefits:

- a lump sum cash payment equal to 200% of his annual base salary;
- 200% multiplied by his target annual bonus for the calendar year in which termination occurs (which bonus shall be prorated for the portion of the calendar year that has elapsed prior to the date of termination if such termination occurs more than 60 days prior to or more than 18 months following a change in control of the Company);
- continuation of health benefits for a period of up to 24 months following the date of termination;
- immediate acceleration of vesting of his outstanding equity awards that would have vested over the 12-month period following the date of his separation from service had he remained continuously employed during such period (with any performance awards that are eligible to be earned vesting based on performance for the fiscal year in which his termination occurs vesting at the target) (provided that if such termination occurs within 60 days prior to or within 18 months following a change in control of the Company, all of Mr. Kirchner's unvested equity awards will vest (with performance awards vesting at target) on the later of the date of his termination or the date of the change in control);
- a post-termination exercise period for his outstanding stock options of 12 months from the date of termination, or, if earlier, the remaining life of the equity grants; and
- his full bonus amount under the Retention Plan.

The post-employment payments benefits described above will be paid upon Mr. Kirchner's execution of a general release of claims in favor of the Company and subject to his continued compliance with the confidentiality and proprietary rights covenant set forth in the Employment Agreement.

In addition, the Employment Agreement provided Mr. Kirchner with the right to receive up to a maximum of $30,000 for reimbursement of legal fees and expenses incurred in connection with negotiating and executing the Employment Agreement.

The Employment Agreement has an initial term that expires on June 1, 2020, subject to automatic renewal for an additional year unless either party gives 90 days' notice of nonrenewal. Nonrenewal of the initial three-year term by the Company will be deemed a termination of employment without cause and will result in the payments and benefits described above, while expiration of the term under any other circumstances will not be deemed a termination of employment without cause and will not give rise to any payments or benefits. The term of the Employment Agreement will automatically be extended for 18 months following a change in control of the Company if the term would otherwise have expired during such 18-month period.

Severance Agreements with Messrs. Andersen, Davis, Dharan and Skaaden

The Company has entered into severance agreements with each of Messrs. Andersen, Davis, Dharan and Skaaden. The terms of the agreements with Messrs. Andersen, Davis and Skaaden are through February 2021, and Mr. Dharan's agreement expires in October, 2021, or, if earlier, the date on which all payments or benefits required thereunder have been paid or provided in their entirety. Each term may be renewed by mutual agreement between the Company and the NEO. Each of the severance agreements provides that if the executive's employment is terminated by us without cause or if the executive resigns for good reason, the executive will be entitled to receive the following payments and benefits:

- his fully earned but unpaid base salary and his earned but unpaid vacation through the date of termination;
- a lump sum cash payment equal to 100% of his annual base salary;
- continuation of health benefits for a period of 12 months following the date of termination; and
- his target annual bonus for the calendar year in which termination occurs (which bonus shall be prorated for the portion of the calendar year that has elapsed prior to the date of termination).

The severance payments and benefits described above will be paid upon the NEO's execution of a general release of claims in favor of the Company.

Change in Control Severance Agreements with Messrs. Andersen, Davis, Dharan and Skaaden

The Company has entered into change in control severance agreements with Messrs. Andersen, Davis, Dharan and Skaaden. The terms of the agreements with Messrs. Andersen, Davis and Skaaden are through February 2021, and Mr. Dharan's agreement expires on October 16, 2021, or, if earlier, the date on which all payments or benefits required thereunder have been paid or provided in their entirety; provided, that the term of each agreement will automatically be extended for 18 months following a change in control of the Company if the term would otherwise have expired during such period. The change in control severance agreements also provide that, if an executive's employment is terminated by us without cause or if the executive resigns for good reason, in either case, within 60 days prior to or within 18 months following a change in control, the executive will be entitled to receive the following payments:

- his fully earned but unpaid base salary and his earned but unpaid vacation through the date of termination;
- a lump sum cash payment equal to 100% of his annual base salary;
- his target annual bonus for the calendar year in which termination occurs;
- continuation of health benefits for a period of up to 12 months following the date of termination; and
- immediate acceleration of vesting of his outstanding equity awards (with any performance-based awards vesting at target, except to the extent alternative acceleration is specifically provided for pursuant to the grant documents) as of the later of the date of termination or the date of such change in control.

The severance benefits described above will be reduced by any severance benefits payable to Messrs. Andersen, Dharan and Skaaden under their severance agreements and will be paid upon the executive's execution of a general release of claims in favor of the Company and subject to their continued compliance with the confidentiality and proprietary rights covenant set forth in the change in control severance agreement.

Defined Terms

For purposes of the Employment Agreement and the severance agreements and the change in control severance agreements, "cause" means, generally, an executive's gross negligence or willful misconduct in the performance of his duties, the executive's willful and habitual neglect of or failure to perform his duties, the executive's commission of any material act of fraud, dishonesty or financial or accounting impropriety with respect to our Company which results in a personal benefit to the executive, the executive's failure to cooperate with us in any investigation or formal proceeding initiated by a governmental authority or otherwise approved by our Board of Directors or the Audit Committee of the Board of Directors, the executive's conviction of or plea of guilty or nolo contender to felony criminal conduct (other than moving vehicle violations), the executive's material violation of our confidentiality and proprietary rights agreement or any similar agreement with the Company, or the executive's material breach of any obligation or duty under the agreement or any written employment or other written policies of our Company.

For purposes of the Employment Agreement and the severance agreements and the change in control severance agreements, “good reason” means, generally, a material diminution in the executive’s authority, duties or responsibilities, a material diminution in the executive’s base compensation or target bonus opportunity, unless such a reduction is imposed across-the-board to senior management, a material change in the geographic location at which the executive must perform his duties, or any other action that constitutes our material breach of the agreement.

For purposes of the Employment Agreement and the severance agreements and the change in control severance agreements, “change in control” is generally defined as:

- a merger or consolidation in which the Company is a party, other than a merger or consolidation which results in our outstanding voting securities immediately before the transaction continuing to represent a majority of the voting power of the acquiring company’s outstanding voting securities; or
- the sale of all or substantially all of our assets.

2003 Equity Plan

We routinely grant our executive officers stock awards pursuant to our 2003 Equity Plan. In the event of a change of control, the vesting of each outstanding award shall be subject to accelerated vesting such that 100% of the awards will become vested and exercisable or payable, as applicable, if the successor corporation refuses to assume the awards, or to substitute substantially equivalent awards.

REPORT OF THE COMPENSATION COMMITTEE

The Compensation Committee of the Board of Directors (the “Compensation Committee”) has furnished this report on executive compensation.

This report, filed in accordance with Item 407(e)(5) of Regulation S-K, should be read in conjunction with the other information relating to executive compensation which is contained elsewhere in this proxy statement and is not repeated here.

In this context, the Compensation Committee hereby reports as follows:

1. The Compensation Committee has reviewed and discussed the Compensation Discussion and Analysis section contained herein with management.

2. Based on the review and discussions referred to in paragraph (1) above, the Compensation Committee recommended to our Board of Directors, and our Board of Directors has approved, that the Compensation Discussion and Analysis be included in this annual report on Form 10-K.

February 14, 2020

COMPENSATION COMMITTEE
CHRISTOPHER SEAMS, CHAIR
DAVID HABIGER
DARCY ANTONELLIS

Compensation of Named Executive Officers

2019 Summary Compensation of NEOs

Summary Compensation Table

The table below sets forth, for the fiscal years ended December 31, 2019, 2018 and 2017, the salary and bonus earned by and other compensation paid to our NEOs.

Name and Principal Position	Year	Salary ($)	Bonus ($) (1)	Stock Awards ($)(2)	Option Awards ($)(2)	Non-Equity Incentive Plan Compensation ($)(3)	All Other Compensation ($)(4)	Total($)
Jon Kirchner	2019	600,000	—	2,729,764	—	334,231	11,720	3,675,715
Chief Executive Officer	2018	600,000	5,049,366	2,729,764	—	655,800	11,720	9,046,650
	2017	586,194	—	7,409,373	—	371,520	55,406	8,422,493
Robert Andersen	2019	377,512	—	1,444,428	—	158,766	11,717	1,992,423
Chief Financial Officer	2018	362,668	—	887,960	—	299,202	11,306	1,561,136
	2017	348,357	—	1,483,584	—	115,477	8,805	1,956,223
Paul Davis	2019	360,340	—	902,796	—	112,908	11,523	1,387,567
General Counsel and Corporate Secretary	2018	340,008		665,970		198,596	10,557	1,215,131
Murali Dharan	2019	400,000	—	1,138,511	—	232,361	11,720	1,782,592
President of Tessera Intellectual Property Corp.	2018	400,000		235,715		422,320	11,720	1,069,755
	2017	84,872	—	404,082	323,652	—	1,060	813,666
Geir Skaaden	2019	376,680	—	902,796	—	157,397	11,715	1,448,588
Chief Products and Services Officer	2018	354,168	1,275,576	887,960	—	247,057	11,680	2,776,441
	2017	336,580	—	714,980	—	96,849	11,020	1,159,429

(1) The amounts reflected in this column represent the retention bonuses paid to Messrs. Kirchner and Skaaden under the DTS, Inc. 2016 Executive Retention Bonus Plan.
(2) The amounts reflected in this column represent the grant date fair value for service-based stock and option awards granted to the NEOs in the relevant fiscal year and performance-based stock awards scheduled to vest with respect to performance for the relevant fiscal year, measured in accordance with ASC 718, excluding the effect of estimated forfeitures, and do not reflect whether the recipient has actually realized a financial benefit from these awards.
With respect to stock awards granted to Mr. Kirchner and Mr. Dharan during 2017 the vesting of which is performance-based, the vesting is tied to a series of four one-year performance measurement periods and may be earned over four years, with 25% of the total "target" award eligible to be earned each year (commencing with 2017 for Mr. Kirchner and 2018 for Mr. Dharan) at the "target" performance level based on the Company's performance for such year, with up to 200% of the "target" award for each year eligible to be earned at the "maximum" performance level. The performance objectives for each year are to be determined by mutual agreement of Mr. Kirchner and Mr. Dharan, respectively, and the Compensation Committee.
For 2019, the grant date fair value for the portion of the performance-based RSUs granted to Mr. Kirchner in 2017 that was eligible to be earned for 2019 performance was (a) with respect to the March 1, 2017 award, $312,804 at "target" performance for 2019 (with the full grant date fair value of such award, assuming "maximum" performance, equal to $625,608), and (b) with respect to the June 1, 2017 award, $2,416,960 at "target" performance for 2019 (with the full grant date fair value of such award, assuming "maximum" performance, equal to $4,833,920). Because the portion of the performance-based RSUs eligible to be earned for 2019 were deemed probable of achievement at "target" levels for purposes of establishing the grant date fair value of such awards under ASC 718, the grant date fair value of such awards at "target" performance is included in the column above.
For 2019, the grant date fair value for the portion of the performance-based RSUs granted to Mr. Dharan in 2017 that was eligible to be earned for 2019 performance was $235,715 at "target" performance for 2019 (with the full grant date fair value of such award, assuming "maximum" performance, equal to $471,430). Because the portion of the performance-based RSUs eligible to be earned for 2019 were deemed probable of achievement at "target" levels for purposes of establishing the grant date fair value of such awards under ASC 718, the grant date fair value of such awards at "target" performance is included in the column above.
In March 2019, Messrs. Andersen, Davis, Dharan and Skaaden were granted 63,550, 39,720, 39,720 and 39,720 time-based RSUs, respectively. For the methodology of how the grant date fair value is calculated for the stock awards, please see Note 13 of the Notes to Consolidated Financial Statements included in this Form 10-K.
(3) Includes compensation under the MBO Plan.
(4) For each of the NEOs, includes Company 401(k) contributions and life insurance premiums paid by the Company on behalf of the NEOs.

Grants of Plan-Based Awards

The table below sets forth information concerning grants of plan-based awards in 2019 to our NEOs.

			Estimated Future Payouts Under Non-Equity Incentive Plan Awards (2)			Estimated Future Payouts Under-Equity Incentive Plan Awards (2)			All Other Stock Awards: Number of Shares of Stock or Units	All Other Option Awards: Number of Securities Underlying Options	Exercise or Base Price of Option Awards	Grant Date Fair Value of Stock and Option Awards
Name	**Grant Date**	**Approval Date**	**Threshold ($)**	**Target ($)**	**Maximum ($)**	**Threshold (#)**	**Target (#)**	**Maximum (#)**	**(#) (3)**	**(#)**	**($)**	**($) (4)**
Jon Kirchner	03/01/2019	01/30/2019	—	600,000	1,200,000	—	—	—	—	—	—	—
	03/01/2017	01/25/2017	—	—	—	—	8,750	17,500	—	—	—	312,804
	06/01/2017	04/28/2017	—	—	—	—	77,718	155,436	—	—	—	2,416,960
Robert Andersen	03/01/2019	01/30/2019	—	285,012	570,024	—	—	—	63,550	—	—	1,444,428
Paul Davis	03/01/2019	01/30/2019	—	200,204	400,409	—	—	—	39,720	—	—	902,796
Murali Dharan	03/01/2019	01/30/2019	—	400,000	800,000	—	—	—	39,720	—	—	902,796
	10/16/2017	010/3/2017	—	—	—	—	10,500	21,000	—	—	—	235,715
Geir Skaaden	03/01/2019	01/30/2019	—	285,012	570,024	—	—	—	39,720	—	—	902,796

(1) These awards were granted under the Company's MBO Plan. See further details in the "2019 Annual Cash Incentive Bonuses" section of the Compensation Discussion and Analysis section above.
(2) Represents the portion of the performance-based RSUs granted to Messrs. Kirchner and Dharan in 2017 that was eligible to be earned based on 2019 performance. The goals and objectives set by the Compensation Committee for the release of these RSUs are described in the "Equity Incentive Awards" section of the Compensation Discussion and Analysis section above. The performance-based RSUs are subject to acceleration of vesting pursuant to agreements entered into with the NEOs as described in the "Employment Contracts, Termination of Employment Arrangements and Change in Control Arrangements" section of the Compensation Discussion and Analysis section above. With respect to the performance-based RSUs granted to Mr. Kirchner in 2017, amounts shown at "target" represent one-fourth of the total "target" number of performance-based RSUs granted on March 1, 2017 and June 1, 2017, representing that portion of the total award that was eligible to be earned based on 2019 performance at "target" levels. With respect to stock awards granted to Mr. Kirchner during 2017 the vesting of which is performance-based, the vesting is tied to a series of four one-year performance measurement periods and may be earned over four years, with 25% of the total "target" award eligible to be earned each year (commencing with 2017) at the "target" level based on the Company's performance for such year, with up to 200% of the "target" award for each year eligible to be earned at the "maximum" performance level. The performance objectives for each year are to be determined by mutual agreement of Mr. Kirchner and the Compensation Committee. The maximum amounts shown reflect one-fourth of the maximum number of performance-based RSUs (200% of the "target" performance-based RSUs granted) that can be earned presuming maximum performance under the 2019 performance goals. With respect to the performance-based RSUs granted to Mr. Dharan on October 16, 2017, amounts shown at "target" represent one-fourth of the total "target" number of performance-based RSUs granted, representing that portion of the total award that was eligible to be earned based on 2019 performance at "target" levels. The vesting is tied to a series of four one-year performance measurement periods and may be earned over four years, with 25% of the total "target" award eligible to be earned each year (commencing with 2018) at the "target" level based on the Company's performance for such year, with up to 200% of the "target" award for each year eligible to be earned at the "maximum" performance level. The performance objectives for each year are to be determined by mutual agreement of Mr. Dharan and the Compensation Committee. The maximum amounts shown reflect one-fourth of the maximum number of performance-based RSUs (200% of the "target" performance-based RSUs granted) that can be earned presuming maximum performance under the 2019 performance goals.
(3) The time-based RSU awards vest as follows: 25% of the shares subject to the equity awards will vest annually following the grant date of the award, to the extent the executive is employed with or retained as a consultant by the Company on the vesting dates. The RSU awards are subject to acceleration of vesting pursuant to agreements entered into with the NEOs as described and referenced under "Employment, Severance and Change in Control Arrangements".
(4) The amounts reflected in this column represent the grant date fair value for the stock awards reflected in the table above, measured in accordance with ASC 718, excluding the effect of estimated forfeitures, and do not reflect whether the recipient has actually realized a financial benefit from these awards. For the methodology of how the grant date fair value is calculated for the stock and option awards, please see Note 13 of the Notes to Consolidated Financial Statements included in this Form 10-K.

Outstanding Equity Awards at Fiscal Year-End

The table below sets forth information concerning the number and value of unexercised stock options and unvested stock awards held by the NEOs at December 31, 2019:

		Option Awards (1)				Stock Awards (2)			
Name	Grant Date	Number of Securities Underlying Unexercised Options Exercisable (#)	Number of Securities Underlying Unexercised Options Unexercisable (#)	Option Exercise Price ($)	Option Expiration Date	Number of Shares or Units of Stock That Have Not Vested (#) (2)	Market Value of Shares or Units of Stock That Have Not Vested ($) (3)	Equity Incentive Plan Awards: Number of Unearned Shares or Units or Other Rights That Have Not Vested (#)	Equity Incentive Plan Awards: Market or Payout Value of Unearned Shares, Units or Other Rights That Have Not Vested ($) (3)
Jon	2/16/2011	57,773	—	$ 43.77	2/16/2021	—	—	—	—
Kirchner(5)	2/14/2013	39,716	—	$ 19.34	2/14/2023	—	—	—	—
	3/13/2014	31,518	—	$ 19.24	3/13/2024	—	—	—	—
	2/11/2016	—	—	—	—	13,238	244,903	—	—
	3/1/2017	—	—	—	—	7,500	138,750	—	—
	3/1/2017	—	—	—	—	5,128 (4)	94,868	8,750 (4)	161,875
	6/1/2017	—	—	—	—	66,615	1,232,378	—	—
	6/1/2017	—	—	—	—	45,543 (4)	842,546	77,718 (4)	1,437,783
Robert	1/2/2014	39,000	—	$ 19.73	1/1/2024	—	—	—	—
Andersen	3/1/2016	—	—	—	—	3,500	64,750	—	—
	3/1/2017	—	—	—	—	15,000	277,500	—	—
	4/27/2018	—	—	—	—	30,000	555,000	—	—
	3/1/2019	—	—	—	—	63,550	1,175,675	—	—
Paul	10/14/2013	13,800	—	$ 20.43	10/13/2023	—	—	—	—
Davis	3/1/2016	—	—	—	—	4,500	83,250	—	—
	3/1/2017	—	—	—	—	10,000	185,000	—	—
	4/27/2018	—	—	—	—	22,500	416,250	—	—
	3/1/2019	—	—	—	—	39,720	734,820	—	—
Murali	10/16/2017	35,000	35,000	$ 22.45	10/15/2027	9,000	166,500	—	—
Dharan	10/16/2017	—	—	—	—	9,975 (4)	184,538	21,000 (4)	388,500
	10/16/2017	—	—	—	—	—	—	60,000 (6)	1,110,000
	3/1/2019	—	—	—	—	39,720	734,820	—	—
Geir	2/16/2011	4,850	—	$ 43.77	2/16/2021	—	—	—	—
Skaaden(5)	2/13/2013	3,142	—	$ 18.65	2/13/2023	—	—	—	—
	3/13/2014	8,917	—	$ 19.24	3/13/2024	—	—	—	—
	2/11/2016	—	—	—	—	3,482	64,417	—	—
	3/1/2017	—	—	—	—	10,000	185,000	—	—
	4/27/2018	—	—	—	—	30,000	555,000	—	—
	3/1/2019	—	—	—	—	39,720	734,820	—	—

(1) Stock option awards have a ten-year term from the grant date and vest as follows: 1/4th of the shares subject to the equity awards will vest annually following the grant date, to the extent the NEO is employed with or retained as a consultant by the Company on the vesting dates. All stock option awards are subject to acceleration of vesting pursuant to agreements entered into with the respective executive officers as described and referenced under "Employment Contracts, Termination of Employment Arrangements and Change in Control Arrangements" below.
(2) The RSU awards vest as follows: 25% of the shares subject to the equity awards will vest annually following the grant date, to the extent the executive is employed with or retained as a consultant by the Company on the vesting dates. For RSU awards granted on April 27, 2018, 25% of the shares vest on the first anniversary of the grant date, then on each of March 1, 2020-2022 thereafter. All time-based restricted stock are subject to acceleration of vesting pursuant to agreements entered into with the respective executive officers as described and referenced under "Employment, Severance and Change in Control Arrangements" below.

(3) This value is based on the December 31, 2019 closing price of our common stock of $18.50 as reported by the Nasdaq Global Select Market.
(4) Represents performance-based RSUs granted to the NEOs. The goals and objectives set by the Compensation Committee for the release of these RSUs are described in the "Equity Incentive Awards" section of the Compensation Discussion and Analysis section above. The performance-based RSUs are subject to acceleration of vesting pursuant to agreements entered into with the NEOs as described in the "Employment Contracts, Termination of Employment Arrangements and Change in Control Arrangements" section of the Compensation Discussion and Analysis section above. With respect to the performance-based RSUs granted to Mr. Kirchner in 2017, amounts shown represent the total number of performance- based RSUs granted on March 1, 2017 and June 1, 2017 to Mr. Kirchner that were unvested as of December 31, 2019 and which will be eligible to be earned over the remainder of the four-year performance cycle, of which one-half of such remaining awards were eligible to be earned based on 2019 performance. With respect to these performance-based RSUs, the vesting is tied to a series of four one-year performance measurement periods and may be earned over four years, with 25% of the total "target" award eligible to be earned each year (commencing with 2017) at the "target" level based on the Company's performance for such year, with up to 200% of the "target" award for each year eligible to be earned at the "maximum" performance level. The performance objectives for each year are determined by mutual agreement of Mr. Kirchner and the Compensation Committee. The performance-based RSUs that remain eligible to vest based on 2020 performance are reflected at "target" levels in the table above and show what would be earned by Mr. Kirchner if "target" performance levels are achieved for 2020, the final remaining year in the four-year performance cycle under the award. In January 2020, the Compensation Committee determined that the 2019 performance objectives were achieved at 58.6%. As a result, 50,671 of Mr. Kirchner's RSUs will vest in March 2020 (5,128 RSUs from the March 1, 2017 RSU award and 45,543 RSUs from the June 1, 2017 RSU award). The portion of these awards that will vest based on 2019 performance is reflected in the table above based on actual performance and are shown in the "Number of Shares or Units of Stock That Have Not Vested" column since, as of December 31, 2019, the performance conditions had been satisfied and only Mr. Kirchner's continued employment through the vesting date was required.
With respect to the performance-based RSUs granted to Mr. Dharan in 2017, amounts shown represent the total number of performance-based RSUs granted on October 16, 2017 which will be eligible to be earned over the four-year performance cycle commencing on January 1, 2018. With respect to these performance-based RSUs, the vesting is tied to a series of four one-year performance measurement periods and may be earned over four years, with 25% of the total "target" award eligible to be earned each year (commencing with 2018) at the "target" level based on the Company's performance for such year, with up to 200% of the "target" award for each year eligible to be earned at the "maximum" performance level. The performance objectives for each year are determined by mutual agreement of Mr. Dharan and the Compensation Committee. The performance-based RSUs that remain eligible to vest based on 2020 and 2021 performance are reflected at "target" levels in the column above and show what would be earned by Mr. Dharan if "target" performance levels are achieved for each of the these remaining years in the four-year performance cycle under the award. In January 2020, the Compensation Committee determined that the 2019 performance objectives were achieved at 95%. As a result, 9,975 of Mr. Dharan's RSUs will vest in March 2020. The portion of this award that will vest based on 2019 performance is reflected in the table above based on actual performance and is shown in the "Number of Shares or Units of Stock That Have Not Vested" column since, as of December 31, 2019, the performance conditions had been satisfied and only Mr. Dharan's continued employment through the vesting date was required.
(5) Equity awards listed for Messrs. Kirchner and Skaaden for periods prior to December 1, 2016 are in connection with our assumption and conversion of certain of their equity awards in connection with our acquisition of DTS on December 1, 2016.
(6) Reflects the number of RSUs that may vest pursuant to such award. These performance-based RSUs are eligible to vest based on achievement of deal performance goals over a three year performance period. The deal performance goals are the closing of two revenue opportunities with 50% of the RSUs eligible for vesting upon achieving each of two deals. The performance-based RSUs are subject to acceleration of vesting pursuant to agreements entered into with Mr. Dharan as described in the "Employment Contracts, Termination of Employment and Change in Control Arrangements" section of the Compensation Discussion and Analysis section above.

Option Exercises and Stock Vested

The table below sets forth information concerning the number of shares acquired on exercise of option awards and vesting of stock awards in 2019 and the value realized upon vesting by such officers.

	Option Awards		**Stock Awards**	
Name	**Number of Shares Acquired on Exercise (#)**	**Value Realized on Exercise ($)**	**Number of Shares Acquired on Vesting (#)**	**Value Realized on Vesting ($) (1)**
Jon Kirchner	—	—	153,090	3,428,285
Robert Andersen	—	—	24,500	578,806
Paul Davis	—	—	20,500	482,680
Murali Dharan	—	—	15,000	330,120
Geir Skaaden	—	—	21,100	500,804

(1) Amounts realized from the vesting of stock awards are calculated by multiplying the number of shares that vested by the fair market value of a share of our common stock on the vesting date.

Pension Benefits

We do not offer any plans that provide for specified retirement payments and benefits other than a tax-qualified 401(k) plan generally available to all employees.

Nonqualified Deferred Compensation

We do not offer nonqualified deferred compensation.

Potential Payments Upon Change In Control Termination

The following table summarizes potential change in control and severance payments benefits to be received by each NEO in the event of (1) a termination of employment as a result of the NEO's resignation for good reason or termination of employment by us other than for cause, and (2) such a termination within 60 days prior or 18 months following a change in control of the Company. The table assumes that the termination and change in control, if applicable, occurred on December 31, 2019. For purposes of estimating the value of amounts of equity compensation to be received in the event of a termination of employment or change in control, we have assumed a price per share of our common stock of $18.50, which represents the closing market price of our common stock as reported by the Nasdaq Global Select Market on December 31, 2019, the last trading day of 2019. The following table reflects the payments and benefits that would have arisen under the Employment Agreement and the severance and change in control severance agreements in effect with the NEOs on December 31, 2019.

Name	Benefit Type	Payment in the Case of a Resignation for Good Reason or a Termination Other Than for Cause ($)	Payment in the Case of a Resignation for Good Reason or a Termination Other Than for Cause, if Within 60 Days Prior or 18 Months Following a Change in Control ($)
Jon Kirchner	Cash Payments	2,400,000(1)	2,400,000(1)
	Value of Stock Award Acceleration	2,530,125(2)	4,815,347(3)
	Value of Health Benefits	75,009(4)	75,009(4)
Robert Andersen	Cash Payments	665,028(5)	665,028(5)
	Value of Stock Award Acceleration	—	2,072,925(3)
	Value of Health Benefits	24,569(6)	24,569(6)
Paul Davis	Cash Payments	564,212(5)	564,212(5)
	Value of Stock Award Acceleration	—	1,419,320(3)
	Value of Health Benefits	28,888(6)	28,888(6)
Murali Dharan	Cash Payments	800,000(5)	800,000(5)
	Value of Stock Award Acceleration	—	2,594,070(3)
	Value of Health Benefits	36,830(6)	36,830(6)
Geir Skaaden	Cash Payments	665,028(5)	665,028(5)
	Value of Stock Award Acceleration	—	1,539,237(3)
	Value of Health Benefits	36,830(6)	36,830(6)

(1) Cash payment is payable in a lump sum amount equal to 200% multiplied by the sum of (A) executive's base salary at the time of termination, plus (B) Executive's target annual bonus for the calendar year provided that in the event termination occurs more than 60 days prior to the Change in Control or more than 18 months following a Change in Control, such bonus shall be prorated for the portion of the calendar year that has elapsed prior to the date of termination. Because the termination is deemed to occur on December 31, 2019, the full target bonus is reflected in the table and no proration has been applied.

(2) Represents the value of those stock awards that would vest over the 12-month period following December 31, 2019 and stock awards with performance-based vesting scheduled to be measured with respect to the fiscal year ending December 31, 2019 being deemed satisfied at target based on the difference between the exercise or purchase price, if any, and $18.50, which was the closing price of our common stock as reported by the Nasdaq Global Select Market on December 31, 2019.
(3) Represents the value of all stock awards and all stock awards with performance-based vesting being deemed satisfied at target that would vest upon such termination based on the difference between the exercise or purchase price, if any, and $18.50, which was the closing price of our common stock as reported by the Nasdaq Global Select Market on December 31, 2019. For purposes of the table above, the value of the performance-based equity awards is presumed to be at target and not at maximum.
(4) Represents the estimated cost of 24 months of continued health coverage.
(5) Cash payment is payable in a lump sum equal to 100% of the sum of (A) executive's base salary plus (B) the executive's target annual bonus for the calendar year provided that in the event termination occurs more than 60 days prior to the Change in Control or more than 18 months following a Change in Control, such bonus shall be prorated for the portion of the calendar year that has elapsed prior to the date of termination. Because the termination is deemed to occur on December 31, 2019, the full target bonus is reflected in the table and no proration has been applied.
(6) Represents the estimated cost of 12 months of continued health coverage.

CEO Pay Ratio Disclosure

Rules adopted under the Dodd-Frank Wall Street Reform and Consumer Protection Act (as subsequently defined by the SEC under Item 402(c)(2)(x) of Regulation S-K) require us to disclose the ratio of our CEO's annual total compensation to the annual total compensation of the "median compensated" employee of all our employees other than our CEO. This pay ratio is a reasonable estimate calculated in a manner consistent with SEC rules based on our payroll records and the methodology described below. Because SEC rules for identifying the median of the annual total compensation of all employees allow companies to adopt a variety of methodologies, apply certain exclusions, and make reasonable estimates and assumptions, the pay ratio reported by other companies may not be comparable to our pay ratio, as other companies have different employee populations and compensation practices and may have used different methodologies, exclusions, estimates and assumptions in calculating their pay ratios.

As permitted under SEC rules, we are using the same median employee identified for purposes of our fiscal 2018 CEO pay ratio, as we believe there have been no changes to our employee population and compensation or the median employee's circumstances that would significantly impact our pay ratio disclosure.

To identify our median employee from our employee population in 2018, we compared the base pay and annual incentive awards of our employees as reflected in our records for 2018. This compensation measure was consistently applied to all our employees included in the calculation. For simplicity, we calculated annual base pay using a reasonable estimate of the hours worked during 2018 for hourly employees and actual salary paid for our remaining employees. We also annualized the compensation of any permanent employees who were hired during 2018 and were working for us on December 1, 2018. Base pay and annual incentive amounts for our employees outside the U.S. were converted to U.S. dollars using the average currency exchange rates for the year in each country. We determined that, as of December 1, 2018 our employee population consisted of approximately 700 individuals, with 393 employees in the United States and 319 employees outside the United States. In determining our employee population, we excluded our employees in Australia (3 employees), France (2 employees), Germany (4 employees), Japan (11 employees), Mexico (2 employees), and Singapore (8 employees) (a total of 30 individuals) pursuant to the *de minimis* exemption provided under SEC rules.

The fiscal 2019 annual total compensation for the median employee was calculated at $141,716, and the annual total compensation of our CEO, Jon Kirchner, was $3,675,715. Therefore, the ratio of annual total compensation of our Chief Executive Officer to our median employee for fiscal 2019 was 26 to 1.

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

Security Ownership of Certain Beneficial Owners and Management

The following table sets forth information with respect to the beneficial ownership of shares of our common stock by (i) each current director and each nominee to become a director, (ii) each named executive officer, (iii) all current directors, nominees and current executive officers as a group, and (iv) each person who we know beneficially owns more than 5% of our common stock as of February 7, 2020.

The number of shares of common stock outstanding used in calculating the percentage for each listed person or entity includes common stock underlying options held by the person or entity that are exercisable within 60 days of February 7, 2020, and common stock underlying RSUs held by the person or entity that will vest within 60 days of February 7, 2020, but excludes common stock underlying options and RSUs held by any other person or entity. Percentage of beneficial ownership is based on 49,861,846 shares of common stock outstanding as of February 7, 2020.

Name of Beneficial Owner	Number of Shares	Percentage Ownership
Five Percent Stockholders		
BlackRock, Inc. (1)	7,487,487	15.0%
Entities affiliated with Vanguard Group, Inc. (2)	5,693,549	11.4%
Ameriprise Financial, Inc. (3)	4,042,990	8.1%
Dimensional Fund Advisors LP (4)	2,509,867	5.0%
Directors and Executive Officers		
Jon Kirchner (5)	511,848	1.0%
Robert Andersen (6)	120,329	*
Geir Skaaden (7)	73,751	*
Murali Dharan (8)	68,651	*
Paul Davis (9)	67,914	*
Richard S. Hill	67,610	*
Christopher Seams	39,758	*
George A. Riedel	31,283	*
David Habiger	14,060	*
Sue Molina	8,314	*
Darcy Antonellis	3,315	*
All directors and executive officers as a group (11 persons) (10)	1,006,833	2.0%

** Represents beneficial ownership of less than 1% of the outstanding shares of our Common Stock.*
(1) The address for BlackRock, Inc. is 55 East 52nd Street, New York, NY 10055. Black Rock, Inc. has sole voting power as to 7,375,813 shares and sole dispositive power as to 7,487,487 shares. The information in this table and footnote is based on solely on information contained in Schedule 13G filed with the SEC on February 4, 2020 by Black Rock, Inc.
(2) The address for Vanguard Group, Inc. is 100 Vanguard Blvd., Malvern, PA, 19355. Vanguard Group, Inc. has sole voting power as to 59,977 shares, shared voting power as to 14,214 shares, sole dispositive power as to 5,626,332 shares and shared dispositive power as to 67,217 shares. The information in this table and footnote is based on solely on information contained in Schedule 13G filed with the SEC on February 12, 2020 by Vanguard Group, Inc.
(3) The address for Ameriprise Financial, Inc. is 145 Ameriprise Financial Center, Minneapolis, MN 55474. Ameriprise Financial, Inc. has shared voting power as to 3,872,172 shares and shared dispositive power as to 4,042,990 shares. The information in this table and footnote is based solely on information contained in Schedule 13G filed with the SEC on February 14, 2020 by Ameriprise Financial, Inc.
(4) The address for Dimensional Fund Advisors LP is 6300 Bee Cave Road, Austin, TX 78746. Dimensional Fund Advisors LP has sole voting power as to 2,395,893 shares and sole dispositive power as to 2,509,867 shares. The information in this table and footnote is based on solely on information contained in Schedule 13G filed with the SEC on February 12, 2020 by Dimensional Fund Advisors LP.
(5) Includes 129,007 shares issuable upon exercise of outstanding options held by Mr. Kirchner, exercisable within 60 days of February 7, 2020 and 67,559 shares subject to RSUs/PSUs that will vest and settle within 60 days of February 7, 2020.
(6) Includes 39,000 shares issuable upon exercise of outstanding options held by Mr. Andersen, exercisable within 60 days of February 7, 2020 and 36,888 shares subject to RSUs that will vest and settle within 60 days of February 7, 2020.
(7) Includes 16,909 shares issuable upon exercise of outstanding options held by Mr. Skaaden, exercisable within 60 days of February 7, 2020 and 28,412 shares subject to RSUs that will vest and settle within 60 days of February 7, 2020.
(8) Includes 35,000 shares issuable upon exercise of outstanding options held by Mr. Dharan, exercisable within 60 days of February 7, 2020 and 19,905 shares subject to RSUs/PSUs that will vest and settle within 60 days of February 7, 2020.
(9) Includes 13,800 shares issuable upon exercise of outstanding options held by Mr. Davis, exercisable within 60 days of February 7, 2020 and 26,930 shares subject to RSUs that will vest and settle within 60 days of February 7, 2020.
(10) Includes 233,716 shares issuable upon exercise of outstanding options held by current officers and directors as a group, exercisable within 60 days of February 7, 2020 and 179,694 shares subject to RSUs/PSUs that will vest and settle within 60 days of February 7, 2020.

Equity Compensation Plan Information

We have three equity compensation plans that have been approved by our stockholders: the Seventh Amended and Restated 2003 Equity Incentive Plan, the Amended and Restated 2003 Employee Stock Purchase Plan (the “ESPP”) and the Second Amended and Restated International Employee Stock Purchase Plan (the “IESPP”). The following table sets forth the number and weighted-average exercise price of securities to be issued upon exercise of outstanding options, warrants and rights, and the number of securities remaining available for future issuance under all of our equity compensation plans, at December 31, 2019:

Plan Category	Number of Securities to be Issued upon Exercise of Outstanding Options, Warrants and Rights (a)	Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights (b)	Number of Securities Remaining Available for Future Issuance under Equity Compensation Plans (Excluding Securities Reflected in Column (a)) (c)
Equity compensation plans approved by security holders	2,953,098(1)	$ 23.70(2)	3,184,706(3)
Equity compensation plans not approved by security holders	0	0	0
Totals	2,953,098		3,184,706

(1) The number under column (a) includes 303,971 shares issuable upon the exercise of outstanding options with a weighted average exercise price of $23.70 and 2,649,127 shares issuable upon the vesting of outstanding restricted stock unit awards and performance-based restricted stock unit awards at "target" levels under our Seventh Amended and Restated 2003 Equity Incentive Plan. This number does not include awards assumed by us in connection with our acquisition of DTS on December 1, 2016. In connection with our acquisition of DTS, each then outstanding, out-of-the-money, vested or unvested option and each then outstanding, in-the-money, unvested option to purchase shares of DTS common stock was assumed by the Company and converted into an option to purchase shares of the Company's common stock pursuant to the exchange ratio set forth in the merger agreement, and each then outstanding unvested DTS restricted stock unit award was assumed by the Company and converted into a restricted stock unit award of the Company pursuant to the exchange ratio set forth in the merger agreement, in each case with substantially the same terms and conditions as applied to such DTS equity award immediately prior to the effective time of the acquisition. As a result, we assumed awards under the DTS, Inc. 2014 New Employee Incentive Plan, the SRS Labs, Inc. 2006 Stock Incentive Plan, DTS, Inc. 2008 DLL Share Option Plan, DTS, Inc. 2003 Equity Incentive Plan and the DTS, Inc. 2012 Equity Incentive Plan. While the plans will continue to govern the existing awards granted thereunder, they were terminated in connection with the acquisition as to any future awards. As of December 31, 2019, (i) options for 5,157 shares of our common stock were outstanding under the DTS, Inc. 2014 New Employee Incentive Plan with a weighted-average exercise price of $31.63 and 7,220 shares underlying awards of restricted stock units were outstanding under the DTS, Inc. 2014 New Employee Incentive Plan; (ii) options for 37,539 shares of our common stock were outstanding under the SRS Labs, Inc. 2006 Stock Incentive Plan with a weighted- average exercise price of $21.67 and 8,241 shares underlying awards of restricted stock units were outstanding under the SRS Labs, Inc. 2006 Stock Incentive Plan; (iii) options for 121,201 shares of our common stock were outstanding under the DTS, Inc. 2003 Equity Incentive Plan with a weighted-average exercise price of $43.63; (iv) options for 137,427 shares of our common stock were outstanding under the DTS, Inc. 2012 Equity Incentive Plan with a weighted-average exercise price of $19.51 and 55,905 shares underlying awards of restricted stock units were outstanding under the DTS, Inc. 2012 Equity Incentive Plan.

(2) Represents the weighted-average exercise price of outstanding options under our Seventh Amended and Restated 2003 Equity Incentive Plan.

(3) Includes 2,132,967 shares remaining available for future issuance under the Seventh Amended and Restated 2003 Equity Incentive Plan, 749,417 shares remaining available for future issuance under the ESPP, of which 749,417 shares were eligible to be purchased during the offering periods in effect on December 31, 2019, and 302,322 shares remaining available for future issuance under the Existing IESPP, of which 302,322 shares were eligible to be purchased during the offering periods in effect on December 31, 2019, each as of December 31, 2019.

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

Certain Relationships and Related Transactions

Since January 1, 2019, there has not been, nor is there currently planned, any transaction or series of similar transactions to which we were or are a party in which the amount involved exceeds $120,000 and in which any director, nominee for director, executive officer or holder of more than 5% of our capital stock or any member of their immediate families had or will have a direct or indirect material interest other than the compensatory transactions described above and the agreements and transactions described below.

Indemnification Agreements

We have entered into indemnification agreements with each of our directors and officers. As permitted by the Delaware General Corporation Law, we have adopted provisions in our restated certificate of incorporation that limit or eliminate the personal liability of our directors to us for monetary damages for a breach of their fiduciary duty as a director, except for liability for:

- any breach of the director's duty of loyalty to us or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- any unlawful payments related to dividends or unlawful stock repurchases, redemptions or other distributions; or
- any transaction from which the director derived an improper personal benefit.

Pursuant to our restated certificate of incorporation and bylaws, we are obligated, to the maximum extent permitted by Delaware law, to indemnify each of our directors and officers against expenses (including attorneys' fees), judgments, fines, settlements and other amounts actually and reasonably incurred in connection with any proceeding, arising by reason of the fact that such person is or was an agent of the corporation. A "director" or "officer" includes any person who is or was a director or officer of us, is or was serving at our request as a director or officer of another enterprise or was a director or officer of a corporation which was a predecessor corporation of us or of another enterprise at the request of the predecessor corporation. Pursuant to our restated certificate of incorporation and bylaws, we also have the power to indemnify our employees to the extent permitted under Delaware law. Our restated certificate of incorporation and bylaws provide that our Board of Directors may authorize the advancement of expenses for the defense of any action for which indemnification is required or permitted. Our restated certificate of incorporation and bylaws permit us to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of us or, at our request, served in such a capacity for another enterprise.

We have entered into indemnification agreements with each of our directors and officers that are, in some cases, broader than the specific indemnification provisions permitted by Delaware law, and that may provide additional procedural protection. The indemnification agreements require us, among other things, to:

- indemnify officers and directors against certain liabilities that may arise because of their status as officers or directors; and
- advance expenses, as incurred, to officers and directors in connection with a legal proceeding, subject to limited exceptions.

At present, there is no pending litigation or proceeding involving any of our directors, officers or employees in which indemnification is sought, nor are we aware of any threatened litigation or proceeding that may result in claims for indemnification.

Procedures For Approval Of Related Person Transactions

As provided by the Company's written Audit Committee Charter, the Audit Committee must review all related party transactions on an ongoing basis, and approve any related party transaction. The Company's written Code of Business Conduct and Ethics Policy requires that all directors, officers and employees make appropriate disclosure of any situation that could give rise to a conflict of interest to the Company's General Counsel.

Compensation Committee Interlocks And Insider Participation

During the year ended December 31, 2019, Messrs. Seams, Habiger and Ms. Antonellis served as members of the Compensation Committee. Ms. Antonellis was appointed to the Compensation Committee in May 2019. None of such Compensation Committee members has ever been an officer or employee of the Company or any of its subsidiaries during their appointment on the Compensation Committee. In addition, during the year ended December 31, 2019, none of our executive officers served as a member of the Board of Directors or Compensation Committee of an entity that has one or more executive officers serving as members of our Board of Directors or our Compensation Committee.

Item 14. Principal Accountant Fees and Services

Fees For Professional Audit Services

The following is a summary of fees billed by the Company's independent registered public accountants, PricewaterhouseCoopers LLP, for the years ended December 31, 2019 and 2018:

	Fiscal Year 2019	Fiscal Year 2018
Audit Fees(1)	$ 1,925,000	$ 1,956,000
Audit-Related Fees(2)	—	14,000
Tax Fees(3)	—	—
All Other Fees(4)	222,000	157,000
Total Fees	$ 2,147,000	$ 2,127,000

(1) Represents the aggregate fees billed for the audit of the Company's financial statements, review of the financial statements included in

the Company’s quarterly reports and services in connection with the statutory and regulatory filings or engagements for those years.

(2) Represents the aggregate fees billed for assurance and related services that are reasonably related to the performance of the audit or review of the Company’s financial statements and are not reported under “audit fees.”

(3) Represents the aggregate fees billed for tax compliance, advice and planning.

(4) Represents the aggregate fees billed for all products and services provided that are not included under “audit fees,” “audit-related fees” or “tax fees.”

Audit Committee Pre-Approval Policies

Before an independent registered public accountant is engaged by the Company or its subsidiaries to render audit or non-audit services, the Audit Committee shall pre-approve the engagement. Audit Committee pre-approval of audit and non-audit services will not be required if the engagement for the services is entered into pursuant to pre-approval policies and procedures established by the Audit Committee regarding the Company’s engagement of the independent registered public accountants, provided the policies and procedures are detailed as to the particular service, the Audit Committee is informed of each service provided and such policies and procedures do not include delegation of the Audit Committee’s responsibilities under the Exchange Act to the Company’s management. The Audit Committee may delegate to one or more designated members of the Audit Committee the authority to grant pre-approvals, provided such approvals are presented to the Audit Committee at a subsequent meeting. If the Audit Committee elects to establish pre-approval policies and procedures regarding non-audit services, the Audit Committee must be informed of each non-audit service provided by the independent registered public accountants. Audit Committee pre-approval of non-audit services (other than review and attest services) also will not be required if such services fall within available exceptions established by the SEC. All non-audit services provided by PricewaterhouseCoopers LLP during years 2019 and 2018 were pre-approved by the Audit Committee in accordance with the pre-approval policy described above.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) Documents filed as part of this report:

	Page Number
(1) ***Financial Statements***	
Report of Independent Registered Public Accounting Firm	F-1
Consolidated Statements of Cash Flows	F-3
Consolidated Balance Sheets	F-4
Consolidated Statements of Operations	F-5
Consolidated Statements of Comprehensive loss	F-6
Consolidated Statements of Equity	F-7
Notes to Consolidated Financial Statements	F-8
(2) ***Financial Statement Schedule***	
Valuation and Qualifying Accounts	
(3) ***Exhibits***	

The exhibits listed on the Exhibit Index preceding the signature page to this Annual Report are filed as part of this Annual Report.

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Xperi Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Xperi Corporation and its subsidiaries (the "Company") as of December 31, 2019 and 2018, and the related consolidated statements of operations, of comprehensive loss, of equity and of cash flows for each of the three years in the period ended December 31, 2019, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2019 appearing under Item 15(a)(2) (collectively referred to as the "consolidated financial statements"). We also have audited 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 (COSO).

In our opinion, the consolidated financial statements referred to above 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. Also 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 the COSO.

Changes in Accounting Principles

As discussed in Note 3 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2019 and the manner in which it accounts for revenue in 2018.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated 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 consolidated 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 consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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 (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) 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 (iii) 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.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Revenue recognition – Per-Unit Royalty Revenue - A Component of Royalty and License Fees Revenue

As described in Note 4 to the consolidated financial statements, for certain licensees, royalty revenues are generated based on a licensee's production or shipment of licensed products incorporating the Company's intellectual property, technologies or software. Licensees with a per-unit arrangement pay a per-unit royalty for each product manufactured or sold, as set forth in its license agreement. Revenue from per-unit royalty is a component of royalty and license fees revenue which was $280.1 million for the year ended December 31, 2019. Management estimates the royalties earned each quarter based on its forecast of manufacturing and sales activity incurred by licensees in that quarter. Estimating licensees' quarterly royalties prior to receiving the royalty reports requires management to make significant assumptions and judgments related to forecasted trends and growth rates used to estimate quantities shipped by customers.

The principal considerations for our determination that performing procedures relating to revenue recognition – per-unit royalty revenue – a component of royalty and license fees revenue is a critical audit matter are there was significant judgment made by management to determine the estimate of licensees' royalties earned each quarter. This in turn led to significant auditor judgment, subjectivity and effort in performing procedures and evaluating audit evidence relating to estimated licensees' quarterly royalties, including the significant assumptions and judgments related to forecasted trends and growth rates.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the per-unit royalty revenue recognition process, including controls over estimating licensees' quarterly royalties. These procedures also included, among others, for estimated licensees' quarterly royalties where the royalty reports were not yet received, testing management's process for estimating royalties earned, including evaluating the appropriateness of the method testing the completeness, accuracy, and relevance of underlying data used in the estimate and evaluating the reasonableness of significant assumptions used by management, including forecasted trends and growth rates used to estimate quantities shipped by customers. Evaluating the reasonableness of the forecasted trends and growth rates assumptions involved considering i) the accuracy of historical forecasting, ii) historical sales trends, and iii) market conditions and industry trends.

/s/ PricewaterhouseCoopers LLP
San Jose, California
February 18, 2020

We have served as the Company's auditor since 1999.

XPERI CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Years Ended December 31,		
	2019	2018	2017
Cash flows from operating activities:			
Net loss	$ (64,033)	$ (1,763)	$ (56,558)
Adjustments to reconcile net loss to net cash from operating activities:			
Depreciation of property and equipment	6,721	6,676	7,201
Amortization of intangible assets	99,946	108,450	111,930
Stock-based compensation expense	31,554	31,011	33,462
Deferred income tax	(38,611)	(15,578)	(18,294)
Other	2,654	5,322	3,786
Changes in operating assets and liabilities, net of business acquisitions:			
Accounts receivable	6,191	(14,381)	(3,551)
Unbilled contracts receivable, net	130,359	25,503	48,168
Other assets	3,675	(950)	3,458
Accounts payable	1,886	(1,469)	(3,298)
Accrued and other liabilities	(8,679)	(8,915)	19,170
Deferred revenue	(2,410)	1,227	1,791
Net cash from operating activities	169,253	135,133	147,265
Cash flows from investing activities:			
Purchases of property and equipment	(8,813)	(3,338)	(3,323)
Proceeds from sale of property and equipment	55	—	235
Purchases of short-term investments	(40,008)	(20,095)	(33,102)
Proceeds from sales of short-term investments	6,833	8,540	1,035
Proceeds from maturities of short-term investments	27,290	30,925	16,487
Acquisition of business, net of cash acquired	—	(500)	—
Purchases of intangible assets	(4,500)	(4,100)	(176)
Net cash from investing activities	(19,143)	11,432	(18,844)
Cash flows from financing activities:			
Repayment of debt	(150,000)	(100,000)	(6,000)
Contingent consideration payments after acquisition	(1,200)	(419)	—
Dividend paid	(39,502)	(39,187)	(39,509)
Proceeds from exercise of stock options	695	8,008	4,873
Proceeds from employee stock purchase program	5,329	5,196	4,132
Repurchases of common stock	(4,506)	(44,798)	(19,283)
Net cash from financing activities	(189,184)	(171,200)	(55,787)
Net increase (decrease) in cash and cash equivalents	(39,074)	(24,635)	72,634
Cash and cash equivalents at beginning of period	113,625	138,260	65,626
Cash and cash equivalents at end of period	$ 74,551	$ 113,625	$ 138,260
Supplemental disclosure of cash flow information:			
Interest paid	$ 20,891	$ 23,134	$ 28,068
Income taxes paid, net of refunds	$ 15,001	$ 23,679	$ 15,678

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

XPERI CORPORATION
CONSOLIDATED BALANCE SHEETS
(in thousands, except for par value)

	December 31,	
	2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents	$ 74,551	$ 113,625
Short-term investments	46,926	40,739
Accounts receivable, net of allowance for doubtful accounts of $566 and $779 respectively	24,177	30,294
Unbilled contracts receivable	121,826	195,436
Other current assets	13,735	17,434
Total current assets	281,215	397,528
Long-term unbilled contracts receivable	26,672	86,280
Property and equipment, net	32,877	31,037
Operating lease right-of-use assets	17,786	—
Intangible assets, net	232,275	327,720
Long-term deferred tax assets	3,660	3,677
Goodwill	385,784	385,784
Other assets	67,676	3,081
Total assets	$ 1,047,945	$ 1,235,107
LIABILITIES AND EQUITY		
Current liabilities:		
Accounts payable	$ 4,650	$ 2,764
Accrued legal fees	1,316	2,920
Accrued liabilities	41,433	45,336
Current portion of long-term debt	—	—
Deferred revenue	720	3,130
Total current liabilities	48,119	54,150
Long-term deferred tax liabilities	29,735	64,994
Long-term debt, net	334,679	482,193
Noncurrent operating lease liabilities	13,414	—
Other long-term liabilities	76,898	15,623
Total liabilities	502,845	616,960
Commitments and contingencies (Note 15)		
Xperi stockholders' equity:		
Preferred stock: $0.001 par value; 10,000 shares authorized and no shares issued and outstanding	—	—
Common stock: $0.001 par value; 150,000 shares authorized; 63,622 and 62,212 shares issued, respectively, and 49,620 and 48,408 shares outstanding, respectively	64	62
Additional paid-in capital	768,284	730,695
Treasury stock at cost; 14,002 and 13,804 shares of common stock at each period end, respectively	(368,701)	(364,195)
Accumulated other comprehensive loss	(53)	(328)
Retained earnings	148,317	253,208
Total Xperi stockholders' equity	547,911	619,442
Noncontrolling interest	(2,811)	(1,295)
Total equity	545,100	618,147
Total liabilities and equity	$ 1,047,945	$ 1,235,107

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

XPERI CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share amounts)

	Years Ended December 31,		
	2019	2018	2017
Revenue:			
Royalty and license fees	$ 280,067	$ 406,133	$ 373,732
Total revenue	280,067	406,133	373,732
Operating expenses:			
Cost of revenue	8,460	13,291	6,308
Research, development and other related costs	112,345	106,406	105,849
Selling, general and administrative	122,897	127,907	144,649
Amortization expense	99,946	108,450	111,930
Litigation expense	5,127	26,099	36,496
Total operating expenses	348,775	382,153	405,232
Operating income (loss)	(68,708)	23,980	(31,500)
Interest expense	(23,377)	(25,665)	(28,292)
Other income and expense, net	9,028	8,595	1,449
Income (loss) before taxes	(83,057)	6,910	(58,343)
Provision for (benefit from) income taxes	(19,024)	8,673	(1,785)
Net loss	$ (64,033)	$ (1,763)	$ (56,558)
Less: Net loss attributable to noncontrolling interest	(1,503)	(1,474)	—
Net loss attributable to Xperi	$ (62,530)	$ (289)	$ (56,558)
Loss per share attributable to Xperi:			
Basic	$ (1.27)	$ (0.01)	$ (1.15)
Diluted	$ (1.27)	$ (0.01)	$ (1.15)
Weighted average number of shares used in per share calculations-basic	49,120	48,823	49,251
Weighted average number of shares used in per share calculations-diluted	49,120	48,823	49,251

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

XPERI CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

	Years Ended December 31,		
	2019	**2018**	**2017**
Net loss	$ (64,033)	$ (1,763)	$ (56,558)
Other comprehensive income (loss):			
Net unrealized gains (losses) on available-for-sale debt securities, net of tax	275	(25)	(155)
Other comprehensive income (loss)	275	(25)	(155)
Comprehensive loss	(63,758)	(1,788)	(56,713)
Less: Comprehensive loss attributable to noncontrolling interest	(1,503)	(1,474)	—
Comprehensive loss attributable to Xperi	$ (62,255)	$ (314)	$ (56,713)

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

XPERI CORPORATION
CONSOLIDATED STATEMENTS OF EQUITY
(in thousands)

	Total Xperi Stockholders' Equity								
	Common Stock		Additional Paid-In	Treasury Stock		Accumulated Other Comprehensive	Retained	Noncontrolling	
	Shares	Amount	Capital	Shares	Amount	Income (Loss)	Earnings	Interest	Total Equity
Balance at December 31, 2016	48,854	$ 59	$ 644,194	10,742	$ (300,114)	$ (148)	$ 163,794	$ —	$ 507,785
Cumulative-effect adjustment from adoption of ASU 2016-09	—	—	—	—	—	—	829	—	829
Net loss	—	—	—	—	—	-	(56,558)	—	(56,558)
Other comprehensive loss, net of tax	—	—	—	—	—	(155)	-	—	(155)
Cash dividends paid on common stock ($0.80 per share)	-	—	-	—	—	—	(39,509)	—	(39,509)
Issuance of common stock in connection with exercise of stock options	180	—	4,872	—	—	—	—	—	4,872
Issuance of common stock in connection with employee stock purchase plan	164	—	4,132	-	-	—	—	—	4,132
Issuance of restricted stock, net of shares canceled	668	1	—	-	-	—	—	—	1
Repurchases of common stock, shares exchanged	(109)	—	—	109	(3,944)	—	—	—	(3,944)
Repurchases of common stock	(654)	—	-	654	(15,339)	—	—	—	(15,339)
Stock-based compensation expense	—	—	33,462	—	—	—	—	—	33,462
Balance at December 31, 2017	49,103	$ 60	$ 686,660	11,505	$ (319,397)	$ (303)	$ 68,556	$ —	$ 435,576
Cumulative-effect adjustment from adoption of ASU 2014-09	—	—	—	—	—	—	224,128	—	224,128
Issuance of subsidiary shares to noncontrolling interest	—	—	(179)	—	—	—	—	179	-
Net loss	—	—	—	—	—	—	(289)	(1,474)	(1,763)
Other comprehensive loss, net of tax	—	—	—	—	—	(25)	—	—	(25)
Cash dividends paid on common stock ($0.80 per share)	-	—	-	—	—	—	(39,187)	—	(39,187)
Issuance of common stock in connection with exercise of stock options	427	1	8,007	—	—	—	—	—	8,008
Issuance of common stock in connection with employee stock purchase plan	306	—	5,196	—	—	—	—	—	5,196
Issuance of restricted stock, net of shares canceled	871	1	—	—	—	—	—	—	1
Repurchases of common stock, shares exchanged	(162)	—	—	162	(3,429)	—	—	—	(3,429)
Repurchases of common stock	(2,137)	—	—	2,137	(41,369)	—	—	—	(41,369)
Stock-based compensation expense	—	—	31,011	—	—	—	—	—	31,011
Balance at December 31, 2018	48,408	$ 62	$ 730,695	13,804	$ (364,195)	$ (328)	$ 253,208	$ (1,295)	$ 618,147
Issuance of subsidiary shares to noncontrolling interest	—	—	13	—	—	—	—	(13)	—
Net loss	—	—	—	—	—	—	(62,530)	(1,503)	(64,033)
Other comprehensive income, net of tax	—	—	—	—	—	275	—	—	275
Other (1)	—	—	—	—	—	—	(2,859)	—	(2,859)
Cash dividends paid on common stock ($0.80 per share)	—	—	—	—	—	—	(39,502)	—	(39,502)
Issuance of common stock in connection with exercise of stock options	42	—	694	—	—	—	—	—	694
Issuance of common stock in connection with employee stock purchase plan	386	1	5,328	—	—	—	—	—	5,329
Issuance of restricted stock, net of shares canceled	982	1	—	—	—	—	—	—	1
Repurchases of common stock, shares exchanged	(198)	—	—	198	(4,506)	—	—	—	(4,506)
Stock-based compensation expense	—	—	31,554	—	—	—	—	—	31,554
Balance at December 31, 2019	49,620	$ 64	$ 768,284	14,002	$ (368,701)	$ (53)	$ 148,317	$ (2,811)	$ 545,100

(1) Refer to “Note 1 – The Company and Basis of Presentation.”

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

XPERI CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1 – THE COMPANY AND BASIS OF PRESENTATION

Xperi Corporation (the "Company") licenses its innovative products, technologies and inventions to global electronics companies which, in turn, integrate the technologies into their own consumer electronics and semiconductor products. The Company's technologies and inventions are widely adopted and used every day by millions of people. The Company's audio technologies have shipped in billions of devices for the home, mobile and automotive markets. The Company's imaging technologies have been embedded in billions of smartphones and other mobile devices. The Company's semiconductor packaging and interconnect technologies have been licensed to more than 100 customers and have shipped in over 100 billion semiconductor chips.

The consolidated financial statements include the accounts of Xperi Corporation, its wholly owned subsidiaries, and a majority-owned subsidiary. In the fourth quarter of 2018, the Company funded a new subsidiary focused on delivering a new machine learning-based hardware and software platform, and issued shares to non-controlling interests in such subsidiary. At the end of the fourth quarter of 2018, this subsidiary was approximately 85% owned by the Company. As a result of issuing new shares in such entity to noncontrolling interests during 2019, the Company's ownership interest in such entity decreased to approximately 83% as of December 31, 2019. The operating results of such entity have been consolidated in the Company's consolidated financial statements since the fourth quarter of 2018. The accompanying consolidated financial statements have been prepared in accordance with generally accepted accounting principles ("GAAP") in the United States ("U.S."). All significant intercompany balances and transactions are eliminated in consolidation.

The Company's fiscal year ends on December 31. The Company employs a calendar month-end reporting period for its quarterly reporting.

In the first quarter of 2019, the Company recorded an out-of-period adjustment to decrease current unbilled receivables and decrease retained earnings by $2.9 million to correct an error that originated in the first quarter of 2018 in connection with its adoption of Accounting Standards Update ("ASU") No. 2014-09 (Topic 606) "Revenue from Contracts with Customers." The adjustment relates to an error in the Company's interpretation of the payment terms of a contract entered into in a prior year. The Company determined that the error was not material to any of its prior annual and interim period financial statements, and the impact of correcting it is not considered to be material to the financial statements for the year ended December 31, 2019.

On December 18, 2019, the Company entered into an Agreement and Plan of Merger and Reorganization (the "Merger Agreement") with TiVo Corporation ("TiVo") to combine in an all-stock merger of equals transaction (the "Mergers"). The Mergers are expected to close and become effective (the "Effective Time") during the second quarter of 2020, subject to regulatory approvals, the approval by the shareholders of each company, and other customary closing conditions.

Subject to the terms and conditions of the Merger Agreement, each share of Company common stock ("Xperi Common Stock") issued and outstanding immediately prior to the Effective Time, excluding any shares of Xperi Common Stock that are held in treasury, will be converted into the right to receive one share of common stock of the combined company and each share of TiVo common stock ("TiVo Common Stock") issued and outstanding immediately prior to the Effective Time, excluding any shares of TiVo Common Stock that are held in treasury, will be converted into the right to receive 0.455 shares of common stock of the combined company. On a pro forma, fully diluted basis, it is expected that immediately following the Effective Time, Xperi stockholders will own approximately 46.5% of the combined company and TiVo stockholders will own approximately 53.5% of the combined company.

In connection with the Merger Agreement, the Company and TiVo obtained a debt commitment letter from Bank of America, N.A., Royal Bank of Canada, and Barclays Bank PLC to provide a senior secured first lien term loan B facility in an aggregate principal amount of $1,100 million (the "Debt Financing"), subject to the terms and conditions set forth therein. The proceeds from the Debt Financing may be used (i) to pay fees and expenses incurred in connection with the Mergers and the related transactions, (ii) to accomplish the refinancing of existing indebtedness of the Company and TiVo, and (iii) to the extent of any remaining amounts, for working capital and other general corporate purposes.

Reclassification

Certain reclassifications have been made to prior period balances in order to conform to the current period's presentation.

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. The accounting estimates and assumptions that require management's most significant, difficult, and subjective judgment include the estimation of licensees' quarterly royalties prior to receiving the royalty reports, the collectability of accounts receivable, the fair value measurements of goodwill, other intangible assets and investments, the assessment of the recoverability of goodwill, the assessment of useful lives and recoverability of other intangible assets and long-lived assets, recognition and measurement of current and deferred income tax assets and liabilities, the assessment of unrecognized tax benefits and the valuation and recognition of stock-based compensation expense, and business combinations, among others. Actual results experienced by the Company may differ from management's estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments purchased with an original maturity of three months or less at the date of purchase to be cash equivalents. Cash and cash equivalents are maintained with various financial institutions.

Short-term Investments

The Company has investments in debt securities which include corporate bonds and notes, treasury and agency notes and bills, commercial paper, certificates of deposit, and in equity securities consisting of money market funds and common equity securities of publicly traded companies. The Company classifies all investments as current as the securities are available for use, if needed, for current operations.

Marketable Debt Securities

The Company classifies its debt securities as available-for-sale, which are accounted for at fair value with unrealized gains and losses recognized in accumulated other comprehensive income or loss, net of tax, on the Consolidated Balance Sheets. The Company evaluates its debt securities periodically for possible other-than-temporary impairment and reviews factors such as the length of time and extent to which fair value has been below cost basis, the financial condition of the issuer, and the Company's ability and intent to hold the security until maturity on a more-likely-than-not basis. If the declines in the fair value of the investments are determined to be other-than-temporary, the Company reports the credit loss portion of such decline in other income and expense, net, and the remaining noncredit loss portion in accumulated other comprehensive income. The cost of securities sold is based on the specific identification method. Interest and dividend income and realized gains or losses are included in other income and expense, net.

Marketable Equity Securities

Marketable equity securities are measured at fair value with unrealized gains and losses recognized in other income and expense, net, on the Consolidated Statements of Operations.

Fair Value of Financial Instruments

The carrying amount of cash equivalents, accounts receivable, accounts payable and accrued liabilities approximates fair value due to the short-term nature of these instruments. Long-term debt is carried at historical cost and measured at fair value on a quarterly basis for disclosure purposes. See "Note 7 – *Fair Value"* for further information.

Concentration of Credit and Other Risks

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist principally of cash equivalents, short-term investments and accounts receivable. The Company follows a corporate investment policy which sets credit, maturity and concentration limits and regularly monitors the composition, market risk and maturities of these investments. The Company believes that any concentration of credit risk in its accounts receivable is substantially mitigated by the Company's evaluation process, relatively short collection terms and the high level of credit worthiness of its customers. The Company performs ongoing credit evaluations of its customers' financial condition and limits the amount of credit extended when deemed necessary but generally requires no collateral.

At December 31, 2019, the Company had three customers representing 17%, 14% and 11% of aggregate trade receivables, respectively. At December 31, 2018, the Company had two customers representing 17% and 11% of aggregate trade receivables, respectively.

The following table sets forth revenue generated from customers which comprise 10% or more of total revenue for the periods indicated:

	Years Ended December 31,		
	2019	2018	2017
SK hynix Inc.	17%	12%	*
Intel Corporation	11%	*	*
Samsung Electronics, Co. Ltd.	*	38%	*
Micron Technology, Inc.	*	*	11%
Amkor Technologies, Inc.	*	*	10%

* denotes less than 10% of total revenue.

Allowance for Doubtful Accounts

The Company continually monitors customer payments and maintains a reserve for estimated losses resulting from its customers' inability to make required payments. In determining the reserve, the Company evaluates the collectibility of its accounts receivable based upon a variety of factors. In cases where the Company becomes aware of circumstances that may impair a specific customer's ability to meet its financial obligations, the Company records a specific allowance against amounts due. For all other customers, the Company recognizes allowances for doubtful accounts based on its historical write-off experience in conjunction with the length of time the receivables are past due, customer creditworthiness, geographic risk and the current business environment. Actual future losses from uncollectible accounts may differ from the Company's estimates. The allowance for doubtful accounts balance was $0.6 million and $0.8 million as of December 31, 2019 and December 31, 2018, respectively.

Goodwill and Identified Intangible Assets

Goodwill. Goodwill is recorded as the difference, if any, between the aggregate consideration paid for an acquisition and the fair value of the net tangible and identified intangible assets acquired under a business combination. Goodwill also includes acquired assembled workforce, which does not qualify as an identifiable intangible asset. The Company reviews impairment of goodwill annually in the fourth quarter, or more frequently if events or circumstances indicate that the goodwill might be impaired. The Company first assesses qualitative factors to determine whether it is necessary to perform the quantitative goodwill impairment test. If, after assessing the totality of events or circumstances, the Company determines that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then the quantitative goodwill impairment test is unnecessary.

If, based on the qualitative assessment, it is determined that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, then the Company proceeds to perform the quantitative goodwill impairment test. The Company first determines the fair value of a reporting unit using weighted results derived from an income approach and a market approach. The income approach is estimated through the discounted cash flow method based on assumptions about future conditions such as future revenue growth rates, new product and technology introductions, gross margins, operating expenses, discount rates, future economic and market conditions, and other assumptions. The market approach estimates the fair value of the Company's equity by utilizing the market comparable method which is based on revenue multiples from comparable companies in similar lines of business. The Company then compares the derived fair value of a reporting unit with its carrying amount. If the carrying value of a reporting unit exceeds its fair value, an impairment loss will be recognized in an amount equal to that excess, limited to the total amount of goodwill allocated to that reporting unit.

Identified intangible assets. Identified finite-lived intangible assets consist of acquired patents, existing technology, customer relationships, trademarks and trade names, non-compete agreements resulting from business combinations, and acquired patents under asset purchase agreements. The Company's identified intangible assets are amortized on a straight-line basis over their estimated useful lives, ranging from 1 to 15 years. The Company makes judgments about the recoverability of finite-lived intangible assets whenever facts and circumstances indicate that the useful life is shorter than originally estimated or that the carrying amount of assets may not be recoverable. If such facts and circumstances exist, the Company assesses recoverability by comparing the projected undiscounted net cash flows associated with the related asset or group of assets over their remaining lives against their respective carrying amounts. Impairments, if any, are based on the excess of the carrying amount over the fair value of those assets. If the useful life is shorter than originally estimated, the Company would accelerate the rate of amortization and amortize the remaining carrying value over the new shorter useful life.

Identified indefinite-lived intangible assets include in-process research and development (IPR&D) resulting from business combinations. The Company evaluates the carrying value of indefinite-lived intangible assets on an annual basis, and an impairment charge would be recognized to the extent that the carrying amount of such assets exceeds their estimated fair value.

For further discussion of goodwill and identified intangible assets, see "Note 9 – *Acquisitions, Goodwill and Identified Intangible Assets*."

Debt Issuance Costs

Debt issuance costs are presented in the consolidated balance sheet as a deduction from the carrying amount of the long-term debt, and are amortized over the term of the associated debt to interest expense using the effective interest method. In addition, the Company elects to continue to defer the unamortized debt issuance costs when it pays down a portion of the debt as the prepayment is factored into the terms agreed to on the debt.

Treasury Stock

The Company accounts for stock repurchases using the cost method. For reissuance of treasury stock, to the extent that the reissuance price is more than the cost, the excess is recorded as an increase to capital in excess of par value. If the reissuance price is less than the cost, the difference is recorded in capital in excess of par value to the extent there is a cumulative treasury stock paid-in capital balance. Once the cumulative balance is reduced to zero, any remaining difference resulting from the sale of treasury stock below cost is recorded as a reduction of retained earnings.

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. The 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 leases do not provide an implicit rate, the Company generally 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 may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term. As a practical expedient, the Company elected, for all office and facility leases, not to separate nonlease components from lease components and instead to account for each separate lease component and its associated non-lease components as a single lease component. For additional information regarding the Company's leases, refer to "Note 8 – *Leases."*

Revenue Recognition

The Company derives its revenue primarily from royalty and license fees for rights to use the Company's intellectual property and technologies ("IP"). Revenue is recognized upon transfer of control of promised products, services or IP rights to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products, services or licensing of the IP rights. See "Note 4 – *Revenue"* for a detailed discussion on revenue and revenue recognition.

Indemnification

The Company provides indemnification of varying scope to certain customers against claims of intellectual property infringement made by third parties arising from the use of the Company's technologies. In accordance with authoritative guidance for accounting for guarantees, the Company evaluates estimated losses for such indemnification. The Company considers such factors as the degree of probability of an unfavorable outcome and the ability to make a reasonable estimate of the amount of loss. To date, no such claims have been filed against the Company and no liability has been recorded in the Company's financial statements.

As permitted under Delaware law, the Company has agreements whereby it indemnifies its officers and directors for certain events or occurrences while the officer or director is, or was, serving at the Company's request in such capacity. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited; however, the Company believes, given the absence of any such payments in the Company's history, and the estimated low probability of such payments in the future, that the estimated fair value of these indemnification agreements is immaterial. In addition, the Company has directors' and officers' liability insurance coverage that is intended to reduce its financial exposure and may enable the Company to recover any payments, should they occur.

Research, Development and Other Related Costs

Research and development ("R&D") is conducted primarily in-house and targets development of audio and image enhancement technologies, chip-scale, multi-chip and wafer level packaging, circuitry, 3D-IC architectures, wafer and die bonding technologies and new machine learning based hardware and software solutions, including semiconductor chip design and fabrication costs. Research, development and other related costs include expenses associated with applications engineering necessary to port and integrate our technologies and products on third party silicon and into end devices. These costs consist primarily of compensation and related costs for personnel, engineering consulting expenses associated with new product and technology development, product commercialization, quality assurance and testing costs, as well as costs related to patent applications and examinations, product "tear downs" and reverse engineering, materials, supplies and equipment depreciation. All research, development and other related costs are expensed as incurred.

Stock-based Compensation Expense

The Company accounts for stock-based compensation expense in accordance with the authoritative guidance on share-based payments. Under the provisions of the guidance, stock-based compensation expense is measured at the grant date based on the fair value of the option using a Black-Scholes option pricing model and is recognized as expense on a straight-line basis over the requisite service period, which is generally the vesting period.

The authoritative guidance also requires that the Company measure and recognize stock-based compensation expense upon modification of the term of a stock award. The stock-based compensation expense for such modification is the sum of any unamortized expense of the award before modification and the modification expense. The modification expense is the incremental amount of the fair value of the award before the modification and the fair value of the award after the modification, measured on the date of modification. In the event the modification results in a longer requisite period than in the original award, the Company has elected to apply the pool method where the aggregate of the unamortized expense and the modification expense is amortized over the new requisite period on a straight-line basis. In addition, any forfeiture will be based on the original requisite period prior to the modification.

Calculating stock-based compensation expense requires the input of highly subjective assumptions, including the expected term of the stock-based awards, stock price volatility, and the pre-vesting option forfeiture rate. The Company estimates the expected life of options granted based on historical exercise patterns, which are believed to be representative of future behavior. The Company estimates the volatility of the Company's common stock on the date of grant based on historical volatility. The assumptions used in calculating the fair value of stock-based awards represent the Company's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and the Company uses different assumptions, its stock-based compensation expense could be materially different in the future. In addition, the Company is required to estimate the expected forfeiture rate and only recognize expense for those shares expected to vest. The Company estimates the forfeiture rate based on historical experience of its stock-based awards that are granted, exercised and cancelled. If the actual forfeiture rate is materially different from the estimate, stock-based compensation expense could be significantly different from what was recorded in the current period. The Company also grants performance share units (PSUs) to employees or consultants. PSU awards will vest if certain employee-specific or company-designated performance targets are achieved. If minimum performance thresholds are achieved, each PSU award will convert into Xperi common stock at a defined ratio depending on the degree of achievement of the performance target designated by each individual award. If minimum performance thresholds are not achieved, then no shares will be issued. Based upon the expected levels of achievement, stock-based compensation is recognized on a straight-line basis over the PSUs' requisite service periods. The expected levels of achievement are reassessed over the requisite service periods and, to the extent that the expected levels of achievement change, stock-based compensation is adjusted in the period of change and recorded on the statements of operations and the remaining unrecognized stock-based compensation is recorded over the remaining requisite service period. See "Note 13 – *Stock-based Compensation Expense"* for additional detail.

Income Taxes

The Company must make certain estimates and judgments in determining income tax expense for financial statement purposes. These estimates and judgments are used in the calculation of tax credits, tax benefits, tax deductions, and in the calculation of certain deferred taxes and tax liabilities. Significant changes to these estimates may result in an increase or decrease to the Company's tax provision in a subsequent period.

The provision for income taxes was comprised of the Company's current tax liability and changes in deferred income tax assets and liabilities. The calculation of the current tax liability involves dealing with uncertainties in the application of complex tax laws and regulations and in determining the liability for tax positions, if any, taken on the Company's tax returns in accordance with authoritative guidance on accounting for uncertainty in income taxes. Deferred income taxes are determined based on the differences between the financial reporting and tax basis of assets and liabilities. The Company must assess the likelihood that it will be able to recover the Company's deferred tax assets. If recovery is not likely on a more-likely-than-not basis, the Company must increase its provision for income taxes by recording a valuation allowance against the deferred tax assets that it estimates will not ultimately be recoverable. However, should there be a change in the Company's ability to recover its deferred tax assets, the provision for income taxes would fluctuate in the period of such change. See "Note 14 – *Income Taxes"* for additional detail.

Contingencies

From time to time, the Company may be involved in legal and administrative proceedings and claims of various types. The Company records a liability in its consolidated financial statements for these matters when a loss is known or considered probable and the amount can be reasonably estimated. Management reviews these estimates in each accounting period as additional information becomes known and adjusts the loss provision when appropriate. If the loss is not probable or cannot be reasonably estimated, a liability is not recorded in the consolidated financial statements. If a loss is probable but the amount of loss cannot be reasonably estimated, the Company discloses the loss contingency and an estimate of possible loss or range of loss (unless such an estimate cannot be made). The Company does not recognize gain contingencies until they are realized. Legal costs incurred in connection with loss contingencies are expensed as incurred. See "Note 15 – *Commitments and Contingencies*," for further information regarding the Company's pending litigation.

Property and Equipment

Property and equipment are recorded at cost, less accumulated depreciation. Depreciation is calculated using the straight-line method over the related assets' estimated useful lives:

Equipment, furniture and other	1 to 5 years
Leasehold improvements	Lesser of related lease term or 5 years
Building and improvements	Up to 30 years

Expenditures that materially increase asset life are capitalized, while ordinary maintenance and repairs are expensed as incurred.

Foreign Currency Translation

The functional currency of substantially all of the Company's subsidiaries is the U.S. dollar. Certain subsidiaries have monetary assets and liabilities that are denominated in a currency that is different than the functional currency. The gains and losses resulting from the remeasurement and translation of monetary assets denominated in a currency that is different than the functional currency are reflected in the determination of net income (loss).

NOTE 3 – RECENT ACCOUNTING PRONOUNCEMENTS

Recently Adopted Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board ("FASB") issued ASU No. 2014-09 (Topic 606) "Revenue from Contracts with Customers." Topic 606 supersedes the revenue recognition requirements in Topic 605 "Revenue Recognition" (Topic 605), and requires entities to recognize revenue when control of goods or services is transferred to customers at an amount that reflects the consideration to which the entity expects to be entitled in exchange for the goods or services. On January 1, 2018, the Company adopted the new standard using the modified retrospective method, under which the Company recorded a $224 million cumulative net of tax adjustment to the opening balance of retained earnings on January 1, 2018. The adjustment was determined by measuring the impact of the new standard on existing contracts that were not completed as of December 31, 2017. Prior period comparative information has not been restated and continues to be reported under Topic 605 in effect for those periods. This new standard had a material impact on the Company's revenue and its consolidated statement of operations and balance sheet as of and for the year ended December 31, 2018, and is expected to have a material impact on an ongoing basis, with no impact on the timing of customer billings or on cash flows. See "Note 4 – Revenue" for further discussion.

In June 2018, the FASB issued ASU No. 2018-07, "Stock-based Compensation*: Improvements to Nonemployee Share-based Payment Accounting,"* which amends the existing accounting standards for share-based payments to nonemployees. This ASU aligns much of the guidance on measuring and classifying nonemployee awards with that of awards to employees. Under the new guidance, the measurement of nonemployee equity awards is fixed on the grant date. The effective date for the standard is for interim periods in fiscal years beginning after December 15, 2018, with early adoption permitted, but no earlier than the Company's adoption date of Topic 606. The new guidance is required to be applied retrospectively with the cumulative effect recognized at the date of initial application. The Company adopted this standard as of January 1, 2019. The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued ASU No. 2017-12, "*Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities,*" which expands strategies that qualify for hedge accounting, changes how many hedging relationships are presented in the financial statements, and simplifies the application of hedge accounting in certain situations. On January 1, 2019, the Company adopted the amendments to Topic 815. Adoption did not have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, "*Leases*" (Topic 842), which generally requires companies to recognize operating and financing lease liabilities and corresponding right-of-use (ROU) assets on the balance sheet. Under the standard, disclosures are required to meet the objective of enabling users of financial statements to assess the amount, timing, and uncertainty of cash flows arising from leases. On January 1, 2019, the Company adopted the new standard using the modified retrospective transition approach and elected the transition option, under which the Company initially applied the transition requirements to all leases that existed at December 31, 2018, with any residual effects of initially applying Topic 842 recognized as a cumulative effect adjustment to the opening balance of retained earnings on January 1, 2019.

The Company elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed it to carry forward the historical lease classification. Under the optional transition method, the Company opted to continue to apply the legacy guidance in ASC 840, Leases, including its disclosure requirements, in the comparative periods presented in the year it adopted the new leases standard, and therefore did not restate prior period results.

The most significant impact from adopting Topic 842 was the initial recognition of operating lease ROU assets and operating lease liabilities of $17.6 million and $18.8 million, respectively, as of January 1, 2019. Operating lease liabilities consist of both current and noncurrent portions with the current portion included in the balance of accrued liabilities. The standard did not materially impact the Company's Consolidated Statements of Operations and had no impact on cash flows.

The cumulative effect of the changes made to the Company's Consolidated Balance Sheet as of January 1, 2019 for the adoption of Topic 842 was as follows (in thousands):

	Balance at December 31, 2018	Adjustments due to Topic 842		Balance at January 1, 2019
Assets				
Operating lease right-of-use assets	$ —	$ 17,594		$ 17,594
Liabilities				
Accrued liabilities	$ 45,336	$ 3,858	(1)	$ 49,194
Noncurrent operating lease liabilities	$ —	$ 13,736		$ 13,736

(1) Consists of a debit adjustment of $1.2 million to deferred rent to eliminate the existing balance and a credit adjustment of $5.1 million to record the current portion of operating lease liabilities.

Recent Accounting Pronouncements

In September 2016, the FASB issued ASU No. 2016-13, "*Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*" ("ASU 2016-13"), which introduces an approach based on expected losses to estimate credit losses on certain types of financial instruments. It also modifies the impairment model for available-for-sale debt securities and provides for a simplified accounting model for purchased financial assets with credit deterioration since their origination. The company will adopt ASU 2016-13 in the first quarter of 2020 by using the modified retrospective approach to record a cumulative-effect adjustment in retained earnings in the Consolidated Balance Sheet. The Company has completed its initial assessment and currently expects the cumulative-effect adjustment it records in retained earnings in its Consolidated Balance Sheet as of January 1, 2020 will not be material.

On December 18, 2019, FASB released ASU 2019-12, "*Simplifying the Accounting for Income Taxes*" ("ASU 2019-12"). The purpose of the update is to reduce the complexity pertaining to certain areas in accounting for income taxes. Key amendments from ASU 2019-12 include, but are not limited to, the accounting for hybrid tax regimes, step-up in tax basis goodwill in non-business combination transactions, intraperiod tax allocation exception to the incremental approach and interim period accounting for enacted changes in tax law. The effective date of the amendments for public corporations is for fiscal years beginning after December 15, 2020. Although early adoption is permitted, the Company will not early adopt. The Company will continue to analyze the financial impact of ASU 2019-12.

NOTE 4 – REVENUE

Revenue Recognition

The Company derives its revenue primarily from royalty and license fees for rights to use the Company's intellectual property and technologies ("IP"). Revenue is recognized upon transfer of control of promised products, services or IP rights to customers in an amount that reflects the consideration the Company expects to receive in exchange for those products, services or licensing of the IP rights.

Certain licensees have entered into fixed fee or minimum guarantee arrangements, whereby licensees pay a fixed fee for the right to incorporate the Company's technology in the licensee's products over the license term. In arrangements with a minimum guarantee, the fixed fee component corresponds to a minimum number of units or dollars that the customer must produce or pay, with additional per-unit fees for any units or dollars exceeding the minimum. In most cases, the customer pays the fixed license fee in specified installments over the license term. For both fixed fee and minimum guarantee agreements, the Company recognizes the full fixed fee as revenue at the beginning of the license term, when the licensee has the right to use the IP and begins to benefit from the license.

If the contract term of a fixed fee or minimum guarantee arrangement is longer than one year, the Company also considers the scheduled payment arrangements to determine whether a significant financing component exists. In general, if the payment arrangements extend beyond the initial twelve months of the contract, the Company treats a portion of the payments as a significant financing component. When the payments are expected to be received within one year or less, the Company does not adjust the promised amount of consideration for the effects of a financing component. The discount rate used for each arrangement reflects the rate that would be used in a separate financing transaction between the Company and the licensee at contract inception and takes into account the credit characteristics of the licensee and market interest rates as of the date of the agreement. As such, the amount of fixed fee revenue recognized at the beginning of the license term will be reduced by the

calculated financing component. As payments are received from the licensee, the Company recognizes a portion of the financing component as interest income, reported as other income and expense in the Consolidated Statements of Operations.

For certain licensees, royalty revenues are generated based on a licensee's production or shipment of licensed products incorporating the Company's IP, technologies or software. Licensees with a per-unit arrangement pay a per-unit royalty for each product manufactured or sold, as set forth in its license agreement. Licensees generally report manufacturing or sales information in the quarter subsequent to when the production or shipment activity takes place. The Company estimates the royalties earned each quarter based on its forecast of manufacturing and sales activity incurred by its licensees in that quarter. Any differences between actual royalties owed by a licensee and the Company's quarterly estimate are recognized in the following quarter, when the licensee's royalty report is received. Estimating licensees' quarterly royalties prior to receiving the royalty reports requires the Company to make significant assumptions and judgments related to forecasted trends and growth rates used to estimate quantities shipped by customers, which could have a material impact on the amount of revenue it reports on a quarterly basis.

The Company actively monitors and enforces its IP, including seeking appropriate compensation from customers that have under-reported royalties owed under a license agreement and from third parties that utilize the Company's intellectual property without a license. As a result of these activities, the Company may, from time to time, recognize revenue from payments resulting from periodic compliance audits of licensees for underreporting royalties incurred in prior periods, as part of a settlement of a patent infringement dispute, or from legal judgments in a license dispute. These recoveries and settlements may cause revenue to be higher than expected during a particular reporting period and such recoveries may not occur in subsequent periods. The Company recognizes revenue from recoveries when a binding agreement has been executed and the Company concludes collection under that agreement is likely.

In some instances, the Company may enter into license agreements containing multiple performance obligations that include engineering services in addition to a technology or software license. For such arrangements where all components are capable of being distinct and accounted for as separate performance obligations, the Company allocates revenue to each performance obligation based on its relative standalone selling price. The Company generally determines standalone selling prices based on the prices ordinarily charged to customers, or in some cases by applying a reasonable cost-plus margin. The consideration for engineering services is recognized as the underlying performance obligations are satisfied. Generally, the Company satisfies performance obligations over time and therefore recognizes revenue over time by measuring the progress toward completion of the performance obligation at each reporting period.

From time to time, the Company enters into arrangements with licensees in which the Company pays consideration to the licensee. Such payments can take the form of marketing development funds or various rebate incentives. The Company typically accounts for consideration paid to its licensees as a reduction to the transaction price and revenue, unless the payment to the licensee is in exchange for a distinct good or service that the licensee transfers to the Company. In cases where the consideration paid to the licensee is variable, the Company estimates the variable consideration based on the terms of the arrangement and expectations of future outcomes. The Company recognizes the reduction to revenue when it recognizes revenue for transfer of control of promised products, services or IP rights to the licensee.

Revenue is recognized gross of withholding taxes that are remitted directly by the Company's licensees to a local tax authority.

For additional detail on the Company's revenue disaggregated by geographic location, refer to "Note 16 - *Segment and Geographic Information*."

Contract Balances

Unbilled Contracts Receivable

Timing of revenue recognition may differ significantly from the timing of invoicing to customers. Accounts receivable, net, includes amounts billed and currently due from customers. Unbilled contracts receivable represents unbilled amounts expected to be received from customers in future periods, where the revenue recognized to date (or cumulative adjustments to retained earnings in the initial period of adopting Topic 606) exceeds the amount billed, and right to payment is subject to the underlying contractual terms. Unbilled contracts receivable amounts may not exceed their net realizable value and are classified as long-term assets if the payments are expected to be received more than one year from the reporting date.

Deferred Revenue

Deferred revenue includes payments made by licensees for which the corresponding performance obligations have not yet been fully satisfied by the Company and typically arises where performance obligations are satisfied over time.

Additional Disclosures Under Topic 606

The following table presents additional revenue and contract disclosures (in thousands):

	Years Ended December 31,	
	2019	2018
Revenue recognized in the period from:		
Amounts included in deferred revenue at the beginning of the period	$ 3,130	$ 2,347
Performance obligations satisfied in previous periods (true ups and licensee reporting adjustments)*	$ 2,935	$ 1,323

*True ups represent the differences between the Company's quarterly estimates of per unit royalty revenue and actual production/sales-based royalties reported by licensees in the following period. Licensee reporting adjustments represent corrections or revisions to previously reported per unit royalties by licensees, generally resulting from the Company's inquiries or compliance audits.

Remaining revenue under contracts with performance obligations represents the aggregate amount of the transaction price allocated to the performance obligations that are unsatisfied (or partially unsatisfied) under the Company's engineering services contracts. The Company's remaining revenue under contracts with performance obligations was as follows (in thousands):

	December 31,	
	2019	2018
Revenue from contracts with performance obligations expected to be satisfied in:		
One year or less	$ 5,337	$ 3,080
More than one year but less than two years	990	2,289
More than two years	345	—
Total	$ 6,672	$ 5,369

Practical Expedients

The Company expenses sales commissions when incurred because the amortization period generally would have been one year or less. In addition, sales commissions have historically not been a significant expense and are not contemplated to be significant in the future. Sales commissions are recorded in selling, general and administrative expenses in the Consolidated Statement of Operations.

NOTE 5 – COMPOSITION OF CERTAIN FINANCIAL STATEMENT CAPTIONS

Other current assets consisted of the following (in thousands):

	December 31,	
	2019	2018
Prepaid income taxes	$ 2,364	$ 6,768
Prepaid expenses	8,802	8,293
Other	2,569	2,373
	$ 13,735	$ 17,434

Property and equipment, net consisted of the following (in thousands):

	December 31,	
	2019	2018
Equipment, furniture and other	$ 32,504	$ 28,798
Building and improvements	18,258	18,258
Land	5,300	5,300
Leasehold improvements	8,103	6,367
	64,165	58,723
Less: Accumulated depreciation and amortization	(31,288)	(27,686)
	$ 32,877	$ 31,037

Depreciation and amortization expense for the years ended December 31, 2019, 2018 and 2017 amounted to $6.7 million, $6.7 million and $7.2 million, respectively.

Other assets consisted of the following (in thousands):

	December 31,	
	2019	2018
Non-current income tax receivable (1)	$ 64,570	$ —
Other assets	3,106	3,081
	$ 67,676	$ 3,081

(1) See "Note 14 - *Income Taxes*" for detailed information concerning the year-over-year changes.

Accrued liabilities consisted of the following (in thousands):

	December 31,	
	2019	2018
Employee compensation and benefits	$ 18,404	$ 26,858
Third-party royalties	6,165	7,140
Accrued expenses	7,930	3,994
Current portion of operating lease liabilities	5,845	—
Other	3,089	7,344
	$ 41,433	$ 45,336

Other long-term liabilities consisted of the following (in thousands):

	December 31,	
	2019	2018
Long-term income tax payable (1)	$ 76,767	$ 15,493
Other	131	130
	$ 76,898	$ 15,623

(1) See "Note 14 - *Income Taxes*" for detailed information concerning the year-over-year changes.

Accumulated other comprehensive loss consisted of the following (in thousands):

	December 31,	
	2019	2018
Net unrealized loss on available-for-sale debt securities, net of tax	$ (53)	$ (328)
	$ (53)	$ (328)

Other income and expense, net, consisted of the following (in thousands):

	Years Ended December 31,	
	2019	2018
Interest income from significant financing components under Topic 606	$ 5,762	$ 7,672
Interest income from investments	2,359	1,074
Realized and unrealized gain (loss) on marketable equity securities	10	(2,217)
Other income	897	2,066
	$ 9,028	$ 8,595

NOTE 6 – FINANCIAL INSTRUMENTS

The Company has investments in debt securities which include corporate bonds and notes, treasury and agency notes and bills, commercial paper, certificates of deposit, and in equity securities consisting of money market funds and common equity securities of a publicly traded Japanese company. The Company classifies its debt securities as available-for-sale, which are accounted for at fair value with unrealized gains and losses recognized in accumulated other comprehensive income or loss, net of tax, on the Consolidated Balance Sheets. Under ASU 2016-01 (Topic 321), equity securities are measured at fair value with unrealized gains and losses recognized in other income and expense, net, on the Consolidated Statements of Operations.

The following is a summary of marketable securities at December 31, 2019 and December 31, 2018 (in thousands):

	December 31, 2019			
	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Values
Marketable securities				
Corporate bonds and notes	$ 41,730	$ 29	$ (13)	$ 41,746
Commercial paper	4,052	4	—	4,056
Total debt securities	45,782	33	(13)	45,802
Money market funds	2,601	—	—	2,601
Marketable equity securities	3,405	—	(2,281)	1,124
Total equity securities	6,006	—	(2,281)	3,725
Total marketable securities	$ 51,788	$ 33	$ (2,294)	$ 49,527
Reported in:				
Cash and cash equivalents				$ 2,601
Short-term investments				46,926
Total marketable securities				$ 49,527

	December 31, 2018			
	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Values
Marketable securities				
Corporate bonds and notes	$ 28,623	$ —	$ (275)	$ 28,348
Commercial paper	2,999	—	—	2,999
Treasury and agency notes and bills	6,000	—	(53)	5,947
Total debt securities	37,622	—	(328)	37,294
Money market funds	11,499	—	—	11,499
Marketable equity securities	5,662	—	(2,217)	3,445
Total marketable securities	$ 17,161	$ —	$ (2,217)	$ 14,944
Total marketable securities	$ 54,783	$ —	$ (2,545)	$ 52,238
Reported in:				
Cash and cash equivalents				$ 11,499
Short-term investments				40,739
Total marketable securities				$ 52,238

At December 31, 2019 and December 31, 2018, the Company had $121.5 million and $154.4 million, respectively, in cash, cash equivalents and short-term investments. A significant portion of these amounts was held in marketable securities, as shown above. The remaining balance of $72.0 million and $102.1 million at December 31, 2019 and December 31, 2018, respectively, was cash held in operating accounts not included in the tables above.

Debt Securities

The gross realized gains and losses on sales of marketable debt securities were not significant during the years ended December 31, 2019, 2018 and 2017.

Unrealized losses on marketable debt securities were $0.1 million and $0.3 million, net of tax, as of December 31, 2019 and December 31, 2018, respectively. These amounts were related to temporary fluctuations in the value of available-for-sale securities and were due primarily to changes in interest rates and market and credit conditions of the underlying securities. Certain investments with a temporary decline in value are not considered to be other-than-temporarily impaired as of December 31, 2019 because the Company has the intent and ability to hold these investments to allow for recovery, does not anticipate having to sell these securities with unrealized losses and continues to receive interest at the maximum contractual rate. For the years ended December 31, 2019, 2018 and 2017, respectively, the Company did not record any impairment charges related to its marketable securities.

The following table summarizes the fair value and gross unrealized losses related to individual available-for-sale debt securities at December 31, 2019 and 2018, which have been in a continuous unrealized loss position, aggregated by investment category and length of time (in thousands):

December 31, 2019	**Less Than 12 Months**		**12 Months or More**		**Total**	
	Fair Value	**Gross Unrealized Losses**	**Fair Value**	**Gross Unrealized Losses**	**Fair Value**	**Gross Unrealized Losses**
Corporate bonds and notes	$ 20,031	$ (10)	$ 8,753	$ (3)	$ 28,784	$ (13)
Total	$ 20,031	$ (10)	$ 8,753	$ (3)	$ 28,784	$ (13)

December 31, 2018	**Less Than 12 Months**		**12 Months or More**		**Total**	
	Fair Value	**Gross Unrealized Losses**	**Fair Value**	**Gross Unrealized Losses**	**Fair Value**	**Gross Unrealized Losses**
Corporate bonds and notes	$ 5,488	$ (2)	$ 22,860	$ (273)	$ 28,348	$ (275)
Treasury and agency notes and bills	—	—	5,947	(53)	5,947	(53)
Commercial paper	2,999	—	—	—	2,999	—
Total	$ 8,487	$ (2)	$ 28,807	$ (326)	$ 37,294	$ (328)

The estimated fair value of marketable debt securities by contractual maturity at December 31, 2019 is shown below (in thousands). Actual maturities may differ from contractual maturities because issuers may have the right to call or prepay obligations without call or prepayment penalties.

	Estimated Fair Value
Due in one year or less	$ 29,491
Due in one to two years	16,311
Due in two to three years	—
Total	$ 45,802

Equity Securities

On September 19, 2018, the Company purchased seven million common shares of Onkyo Corporation ("Onkyo"), a publicly traded Japanese company and a long-standing customer of the Company, pursuant to the Capital Alliance Agreement ("Agreement") entered into between the two parties on September 3, 2018. Upon making the investment, the Company held a 6.3% ownership interest in Onkyo. Due to changes in business expectations, the Company determined not to continue discussions on the business alliance. On July 5, 2019, the Company sold approximately 2.8 million shares of Onkyo stock, for which a realized gain of $0.9 million was recognized for the year ended December 31, 2019. There were no sales of the Onkyo investment during 2018. The Company intends to sell the remaining shares over time depending on market conditions.

The Company recorded unrealized losses on its Onkyo investment of $0.9 million and $2.2 million during the years ended December 31, 2019 and 2018, respectively, and none for the year ended December 31, 2017. Cumulative unrealized losses on the investment amounted to $2.3 million through December 31, 2019.

Derivatives

In the first quarter of 2019, the Company began to use derivative financial instruments to manage foreign currency exchange rate risk. The Company does not enter into derivative transactions for trading purposes. Cash flows from the derivative programs are classified as cash flows from operating activities in the Consolidated Statements of Cash Flows.

The Company's derivative financial instruments consist of deliverable and non-deliverable foreign currency forward contracts, which are used primarily to hedge balance sheet and certain expenditure exposures. These instruments are generally short-term in nature, with typical maturities of less than one year, and are subject to fluctuations in foreign exchange rates. Fair values for derivative financial instruments are based on prices computed using third-party valuation models and are classified as Level 2 in accordance with the three-level hierarchy of fair value measurements. All significant inputs to the third-party valuation models are observable in active markets. Inputs include current market-based parameters such as forward rates, yield curves and credit default swap pricing. For additional information related to the three-level hierarchy of fair value measurements, see "Note 7 – Fair Value."

Under the Company's policy election, these derivatives are not designated as hedge instruments, and are measured and reported at fair value. Changes in the fair value of these undesignated derivatives are reported in other income and expense, net, on the Consolidated Statements of Operations. Realized losses were not significant in the year ended December 31, 2019. There were no derivative instruments outstanding as of December 31, 2019. The Company did not engage in derivative contracts in 2018 and 2017.

NOTE 7 – FAIR VALUE

The Company follows the authoritative guidance for fair value measurement and the fair value option for financial assets and financial liabilities. The Company carries its financial instruments at fair value with the exception of its long-term debt. Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability, or an exit price, in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The established fair value hierarchy requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. There are three levels of inputs that may be used to measure fair value:

Level 1 Quoted prices in active markets for identical assets.

Level 2 Observable market-based inputs or unobservable inputs that are corroborated by market data.

Level 3 Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets. Level 3 assets and liabilities include financial instruments whose value is determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

When applying fair value principles in the valuation of assets, the Company is required to maximize the use of quoted market prices and minimize the use of unobservable inputs. The Company calculates the fair value of its Level 1 and Level 2 instruments based on the exchange traded price of similar or identical instruments, where available, or based on other observable inputs. There were no significant transfers into or out of Level 1 or Level 2 that occurred between December 31, 2018 and December 31, 2019.

The following sets forth the fair value, and classification within the hierarchy, of the Company's assets required to be measured at fair value on a recurring basis as of December 31, 2019 (in thousands):

	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Marketable securities				
Money market funds - equity securities (1)	$ 2,601	$ 2,601	$ —	$ —
Marketable equity securities (2)	1,124	1,124	—	—
Corporate bonds and notes - debt securities (2)	41,746	—	41,746	—
Commercial paper - debt securities (2)	4,056	—	4,056	—
Total Assets	$ 49,527	$ 3,725	$ 45,802	$ —

(1) Reported as cash and cash equivalents in the Consolidated Balance Sheet.
(2) Reported as short-term investments in the Consolidated Balance Sheet.

The following sets forth the fair value, and classification within the hierarchy, of the Company's assets required to be measured at fair value on a recurring basis as of December 31, 2018 (in thousands):

	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets				
Marketable securities				
Money market funds - equity securities (1)	$ 11,499	$ 11,499	$ —	$ —
Marketable equity securities (2)	3,445	3,445	—	—
Commercial paper - debt securities (2)	2,999	—	2,999	—
Corporate bonds and notes - debt securities (2)	28,348	—	28,348	—
Treasury and agency notes and bills - debt securities (2)	5,947	—	5,947	—
Total Assets	$ 52,238	$ 14,944	$ 37,294	$ —

(1) Reported as cash and cash equivalents in the Consolidated Balance Sheet.
(2) Reported as short-term investments in the Consolidated Balance Sheet.

Financial Instruments Not Recorded at Fair Value on a Recurring Basis

The Company's long-term debt is carried at historical cost and is measured at fair value on a quarterly basis for disclosure purposes. The carrying amounts and estimated fair values are as follows (in thousands):

	December 31, 2019		December 31, 2018	
	Carrying Amount	Estimated Fair Value	Carrying Amount	Estimated Fair Value
Long-term debt, net (1)	$ 334,679	$ 335,642	$ 482,193	$ 450,083

(1) Carrying amounts of long-term debt are net of unamortized debt issuance costs of $9.3 million and $11.8 million as of December 31, 2019 and December 31, 2018, respectively. See "Note 10 – *Debt*" for additional information.

The Company's long-term debt, net, is classified within Level 2. The fair value of the debt was estimated based on the quoted market prices for the same or similar issues or on the current rates offered to the Company for debt of the same remaining maturities.

Non-Recurring Fair Value Measurements

The following table represents the activity in level 3 assets (in thousands):

	Assets held for sale	Other	
Balance at December 31, 2017	$ —	$ 5,944	(1)
Assets transferred	—	—	
Assets sold	—	—	
Assets received	—	—	
Balance at December 31, 2018	$ —	$ 5,944	
Assets transferred	—	—	
Assets sold	—	—	
Assets received	—	—	
Balance at December 31, 2019	$ —	$ 5,944	(2)

(1) This amount represents the value of the patents that were received as part of licensing settlements with customers in 2014, 2016 and 2017. These assets were valued during the same year using a cost methodology based on an arms-length purchase price of bulk patent assets, with adjustments based on limited pick rights, the total available market, and remaining average patent life.
(2) The accumulated amortization associated with the patents was $4.0 million and $3.3 million as of December 31, 2019 and 2018, respectively.

NOTE 8 - LEASES

Under Topic 842, a contract is a lease, or contains a lease, if the contract conveys the right to control the use of identified property, plant, or equipment (an identified asset) for a period of time in exchange for consideration. To determine whether a contract conveys the right to control the use of an identified asset for a period of time, an entity shall assess whether, throughout the period of use, the entity has both of the following: (a) the right to obtain substantially all of the economic benefits from use of the identified asset; and (b) the right to direct the use of the identified asset.

The Company leases office and research facilities and office equipment under operating leases which expire at various dates through 2028. The Company's leases have remaining lease terms of one year to nine years, some of which may include options to extend the leases for five years or longer, and some of which may include options to terminate the leases within one year or less. Leases with an initial term of 12 months or less are not recorded on the balance sheet; the Company recognizes lease expense for these leases on a straight-line basis over the lease term. As a practical expedient, the Company elected, for all office and facility leases, not to separate nonlease components (e.g., common-area maintenance costs) from lease components (e.g., fixed payments including rent) and instead to account for each separate lease component and its associated non-lease components as a single lease component. The Company uses its incremental borrowing rate for purposes of discounting lease payments.

Lease cost is summarized in the table below (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Operating lease cost (1)	$ 7,971	$ 7,188	$ 6,423

(1) Includes short-term leases and variable lease costs, which were immaterial.

Other information related to leases was as follows (in thousands, except lease term and discount rate):

		Year Ended December 31, 2019
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$	6,183
ROU assets obtained in exchange for new lease liabilities:		
Operating leases	$	5,612

	December 31, 2019
Weighted-average remaining lease term (years):	
Operating leases	4.6
Weighted-average discount rate:	
Operating leases	5.7%

Future minimum lease payments and related lease liabilities as of December 31, 2019 were as follows (in thousands):

		Operating Leases
2020	$	6,387
2021		4,558
2022		3,259
2023		3,235
2024		2,619
Thereafter		1,977
Total lease payments		22,035
Less: imputed interest (1)		(2,776)
Present value of lease liabilities	$	19,259
Less: current obligations under leases (accrued liabilities)		5,845
Noncurrent operating lease liabilities	$	13,414

(1) Calculated using the interest rate for each lease.

Note: Future minimum lease payments exclude short-term leases as well as payments to landlords for variable common area maintenance, insurance and real estate taxes.

As of December 31, 2018, future minimum lease payments were as follows (in thousands):

		Operating Leases
2019	$	6,341
2020		5,292
2021		3,441
2022		3,047
2023		3,142
Thereafter		3,518
	$	24,781

NOTE 9 – ACQUISITIONS, GOODWILL AND IDENTIFIED INTANGIBLE ASSETS

On December 18, 2019, the Company entered into a Merger Agreement with TiVo in an all-stock merger of equals transaction. See “Note 1 – *The Company and Basis of Presentation.*”

In 2019, the Company assessed goodwill impairment for its segments by performing a qualitative assessment. No impairment of goodwill was indicated as the Company concluded that it was more likely than not that the fair value of its reporting units exceeded its carrying amount. In addition, there have been no significant events or circumstances affecting the valuation of goodwill subsequent to the impairment testing performed in the fourth quarter of the year ended December 31, 2019.

The changes to the carrying value of goodwill from January 1, 2018 through December 31, 2019 are reflected below (in thousands):

December 31, 2017	$	385,574	
Goodwill acquired through a business acquisition		210	(1)
December 31, 2018	$	385,784	
December 31, 2019	$	385,784	(2)

(1) Related to the acquisition of an emerging technology company in May 2018.
(2) Of this amount, approximately $378.1 million is allocated to the Company's Product Licensing reporting segment and approximately $7.7 million is allocated to its Semiconductor and IP Licensing reporting segment.

Identified intangible assets consisted of the following (in thousands):

		December 31, 2019			December 31, 2018		
	Average Life (Years)	Gross Assets	Accumulated Amortization	Net	Gross Assets	Accumulated Amortization	Net
Acquired patents / core technology	3-15	$ 151,184	$ (135,952)	$ 15,232	$ 146,684	$ (128,691)	$ 17,993
Existing technology	5-10	206,878	(130,890)	75,988	206,878	(96,089)	110,789
Customer contracts and related relationships	3-9	291,769	(174,741)	117,028	291,769	(121,831)	169,938
Trademarks/trade name	4-10	40,083	(16,056)	24,027	40,083	(11,083)	29,000
Non-competition agreements	1	2,231	(2,231)	—	2,231	(2,231)	—
Total intangible assets		$ 692,145	$ (459,870)	$ 232,275	$ 687,645	$ (359,925)	$ 327,720

Amortization expense for the years ended December 31, 2019, 2018, and 2017 amounted to $99.9 million, $108.5 million and $111.9 million, respectively. As of December 31, 2019, the estimated future amortization expense of intangible assets is as follows (in thousands):

2020	$	88,793
2021		81,084
2022		32,645
2023		21,766
2024		5,463
Thereafter		2,524
	$	232,275

NOTE 10 – DEBT

On December 1, 2016, in connection with the consummation of the acquisition of DTS, the Company entered into a Credit Agreement (the "Credit Agreement") by and among the Company, Royal Bank of Canada, as administrative agent and collateral agent, and the lenders party thereto. The Credit Agreement provided for a $600 million seven-year term B loan facility (the "Term B Loan Facility") which matures on November 30, 2023. Upon the closing of the Credit Agreement, the Company borrowed $600 million under the Term B Loan facility. Net proceeds were used on December 1, 2016, together with cash and cash equivalents, to finance the acquisition of DTS.

On January 23, 2018, the Company and the loan parties entered into an amendment to the Credit Agreement (the “Amendment”). In connection with the Amendment, the Company made a voluntary prepayment of $100.0 million of the term loan outstanding under the Credit Agreement using cash on hand. The Amendment provided for, among other things, (i) a replacement of the outstanding initial term loan with the new tranche term B-1 loan (the “Amended Term B Loan”) in a principal amount of $494.0 million, (ii) a reduction of the interest rate margin applicable to such loan to (x) in the case of Eurodollar loans, 2.50% per annum and (y) in the case of base rate loans, 1.50% per annum, (iii) a prepayment premium of 1.00% in connection with any repricing transaction with respect to the Amended Term B Loan within six months of the closing date of the Amendment, and (iv) certain amendments to provide the Company with additional flexibility under the covenant governing restricted payments. Using cash on hand, the Company made three voluntary prepayments totaling $150.0 million during 2019.

The Company’s obligations under the Credit Agreement, as amended by the Amendment, continue to be guaranteed by substantially all of the Company’s subsidiaries, and secured by substantially all of the assets of the Company and its subsidiaries. The Credit Agreement contains customary events of default, upon the occurrence of which, after any applicable grace period, the lenders will have the ability to accelerate all outstanding loans thereunder. The Credit Agreement contains customary representations and warranties and affirmative and negative covenants that, among other things, restrict the ability of the Company to create or incur certain liens, incur or guarantee additional indebtedness, merge or consolidate with other companies, transfer or sell assets and make restricted payments. The Company was in compliance with all requirements during the year ended December 31, 2019.

At December 31, 2019, $344.0 million was outstanding with an interest rate, including the amortization of debt issuance costs, of 5.4%. Interest is payable monthly. There were also $9.3 million of unamortized debt issuance costs recorded as a reduction of the long-term portion of the debt. At December 31, 2018, $494 million was outstanding with unamortized debt issuance costs amounting to $11.8 million. Interest expense was $23.4 million and $25.7 million for the years ended December 31, 2019 and 2018, respectively. Amortized debt issuance costs, which were included in interest expense, amounted to $2.5 million and $2.5 million for the years ended December 31, 2019 and 2018, respectively.

As of December 31, 2019, future minimum principal payments for long-term debt, including the current portion, are summarized as follows (in thousands):

2020	$	—
2021		—
2022		—
2023		344,000
Thereafter		—
Total	$	344,000

Additional payments of debt principal must be made in the event of certain working capital conditions as outlined in the Credit Agreement. There are no penalties for these payments. There were no such additional payments made during the years ended December 31, 2019 and 2018, respectively.

As disclosed in “Note 1 – *The Company and Basis of Presentation*”, in connection with the planned merger with TiVo, the Company and TiVo intend to refinance each company’s debt on a combined basis upon closing of the transaction, which is currently expected in the second quarter of 2020. To meet this objective, the companies have secured $1.1 billion of committed financing as described in “Note 1.”

NOTE 11 – NET LOSS PER SHARE

The following table sets forth the computation of basic and diluted shares (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Denominator:			
Weighted average common shares outstanding	49,120	48,823	49,253
Unvested common shares subject to repurchase	—	—	(2)
Total common shares-basic	49,120	48,823	49,251
Effect of dilutive securities:			
Options	—	—	—
Restricted stock awards and units	—	—	—
Total common shares-diluted	49,120	48,823	49,251

Basic net income (loss) per share is computed using the weighted average number of common shares outstanding during the period, excluding any unvested restricted stock awards that are subject to repurchase. Diluted net income (loss) per share is computed using the treasury stock method to calculate the weighted average number of common shares and, if dilutive, potential common shares outstanding during the period. Potential dilutive common shares include unvested restricted stock awards and units and incremental common shares issuable upon the exercise of stock options, less shares from assumed proceeds. The assumed proceeds calculation includes actual proceeds to be received from the employee upon exercise and the average unrecognized stock compensation cost during the period.

For each of the years ended December 31, 2019, 2018 and 2017, there was no difference in the weighted average number of common shares used for the calculation of basic and diluted loss per share as the effect of all potentially dilutive shares outstanding was anti-dilutive. A total of 1.3 million, 2.9 million and 3.0 million shares subject to stock options and restricted stock awards and units were excluded for the years ended December 31, 2019, 2018 and 2017, respectively, from the computation of diluted net loss per share because including them would have been anti-dilutive.

NOTE 12 – SHAREHOLDERS' EQUITY

Stock Repurchase Programs

In August 2007, the Company's Board of Directors ("the Board") authorized a plan to repurchase the Company's outstanding shares of common stock dependent on market conditions, share price and other factors. As of December 31, 2019, the total amount authorized for repurchases is $450.0 million. As of December 31, 2019, the Company had repurchased a total of approximately 13,279,000 shares of common stock, since inception of the plan, at an average price of $26.25 per share for a total cost of $348.6 million. There were no repurchases during the year ended December 31, 2019. The shares repurchased are recorded as treasury stock and are accounted for under the cost method. No expiration date has been specified for this plan. As of December 31, 2019, the total amount available for repurchase was $101.4 million.

Stock Option Plans

The 2003 Plan

In February 2003, the Board adopted and the Company's stockholders approved the 2003 Equity Incentive Plan ("2003 Plan"). Under the 2003 Plan, incentive stock options may be granted to the Company's employees at an exercise price of no less than 100% of the fair value on the date of grant, and non-statutory stock options may be granted to the Company's employees, non-employee directors and consultants at an exercise price of no less than 85% of the fair value. In both cases, when the optionees own stock representing more than 10% of the voting power of all classes of stock of the Company, the exercise price shall be no less than 110% of the fair value on the date of grant. Options, restricted stock awards, and restricted stock units granted under this plan generally have a term of ten years from the date of grant and vest over a four-year period. Restricted stock, performance awards, dividend equivalents, deferred stock, stock payments and stock appreciation rights may also be granted under the 2003 Plan either alone, in addition to, or in tandem with any options granted thereunder. Restricted stock awards and units are full-value awards that reduce the number of shares reserved for grant under this plan by one and one-half shares for each share granted. The vesting criteria for restricted stock awards and units is generally the passage of time or meeting certain performance-based objectives, and continued employment through the vesting period generally over four years. As of December 31, 2019, there were approximately 2.1 million shares reserved for future grant under this plan.

A summary of the stock option activity is presented below (in thousands, except per share amounts):

	Options Outstanding			
	Number of Shares Subject to Options	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Balance at December 31, 2016	1,332	$ 24.41		
Options granted	70	$ 22.45		
Options exercised	(180)	$ 23.04		
Options canceled / forfeited / expired	(50)	$ 34.73		
Balance at December 31, 2017	1,172	$ 24.06		
Options granted	—	$ —		
Options exercised	(427)	$ 18.75		
Options canceled / forfeited / expired	(67)	$ 34.43		
Balance at December 31, 2018	678	$ 26.39		
Options granted	—	$ —		
Options exercised	(42)	$ 16.66		
Options canceled / forfeited / expired	(31)	$ 33.61		
Balance at December 31, 2019	605	$ 26.68	3.78	$ 130
Vested and expected to vest at December 31, 2019	601		3.77	$ 130
Exercisable at December 31, 2019	560		3.49	$ 130

The following table summarizes information about stock options outstanding and exercisable under all of the Company's plans at December 31, 2019:

	Options Outstanding			Options Exercisable	
Range of Exercise Prices per Share	Number Outstanding (in thousands)	Weighted Average Remaining Contractual Life (in years)	Weighted Average Exercise Price per Share	Number Exercisable (in thousands)	Weighted Average Exercise Price per Share
$12.52 - $19.24	127	3.44	$ 17.86	127	$ 17.86
$19.34 - $20.43	139	3.65	$ 19.92	139	$ 19.92
$20.63 - $22.45	122	5.76	$ 22.16	87	$ 22.05
$22.52 - $38.65	97	5.20	$ 32.30	87	$ 33.39
$43.77 - $43.77	120	1.13	$ 43.77	120	$ 43.77
$12.52 - $43.77	605	3.78	$ 26.68	560	$ 26.97

Restricted Stock Awards and Units

Information with respect to outstanding restricted stock awards and units as of December 31, 2019 is as follows (in thousands, except per share amounts):

	Restricted Stock and Restricted Stock Units			
	Number of Shares Subject to Time-based Vesting	Number of Shares Subject to Performance-based Vesting	Total Number of Shares	Weighted Average Grant Date Fair Value Per Share
Balance at December 31, 2016	1,696	384	2,080	$ 33.91
Awards and units granted	1,049	919	1,968	$ 32.60
Awards and units vested / earned	(581)	(94)	(675)	$ 33.70
Awards and units canceled / forfeited	(150)	(90)	(240)	$ 31.07
Balance at December 31, 2017	2,014	1,119	3,133	$ 33.35
Awards and units granted	1,087	44	1,131	$ 21.85
Awards and units vested / earned	(695)	(176)	(871)	$ 34.84
Awards and units canceled / forfeited	(257)	(230)	(487)	$ 29.35
Balance at December 31, 2018	2,149	757	2,906	$ 29.10
Awards and units granted	1,266	4	1,270	$ 22.79
Awards and units vested / earned	(865)	(118)	(983)	$ 30.62
Awards and units canceled / forfeited	(179)	(89)	(268)	$ 27.53
Balance at December 31, 2019	2,371	554	2,925	$ 25.99

Performance Awards and Units

Performance awards and units may be granted to employees or consultants based upon, among other things, the contributions, responsibilities and other compensation of the particular employee or consultant. The value and the vesting of such performance awards and units are generally linked to one or more performance goals or other specific performance goals determined by the Company, in each case on a specified date or dates or over any period or periods determined by the Company, and range from zero to 100 percent of the grant.

Employee Stock Purchase Plans

In August 2003, the Board adopted the 2003 Employee Stock Purchase Plan (the “ESPP”), which was approved by the Company’s stockholders in September 2003 and became effective February 1, 2004. Subsequently, the Board adopted the International Employee Stock Purchase Plan (the “International ESPP”) in June 2008.

The ESPP has a series of consecutive, overlapping 24-month offering periods. The first offering period commenced February 1, 2004, the effective date of the ESPP, as determined by the Board of Directors.

Individuals who own less than 5% of the Company’s voting stock, are scheduled to work more than 20 hours per week and whose customary employment is for more than five months in any calendar year may join an offering period on the first day of the offering period or the beginning of any semi-annual purchase period within that period. Individuals who become eligible employees after the start date of an offering period may join the ESPP at the beginning of any subsequent semi-annual purchase period.

Participants may contribute up to 20% of their cash earnings through payroll deductions, and the accumulated deductions will apply to the purchase of shares on each semi-annual purchase date. The purchase price per share will equal 85% of the fair market value per share on the participant’s entry date into the offering period or, if lower, 85% of the fair market value per share on the semi-annual purchase date.

An eligible employee’s right to buy the Company’s common stock under the ESPP may not accrue at a rate in excess of $25,000 of the fair market value of such shares per calendar year for each calendar year of an offering period. If the fair market value per share of the Company’s common stock on any purchase date is less than the fair market value per share on the start date of the 24-month offering period, then that offering period will automatically terminate and a new 24-month offering period will begin on the next business day. All participants in the terminated offering will be transferred to the new offering period.

As of December 31, 2019, there were approximately 1,052,000 shares reserved for grant under the ESPP and the International ESPP, collectively.

Dividends

Stockholders of the Company's common stock are entitled to receive dividends when declared by the Company's Board of Directors. The Company has paid a quarterly dividend of $0.20 per share since March 2015. Dividends declared were $0.80 per common share in each of 2019, 2018 and 2017.

Assumed Plans

Certain stock awards plans were assumed in the DTS acquisition during December 2016. The awards outstanding under these plans are included in the tables above. No future grants will be made under these plans.

NOTE 13 – STOCK-BASED COMPENSATION EXPENSE

The effect of recording stock-based compensation expense for the years ended December 31, 2019, 2018 and 2017 is as follows (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Cost of revenue	$ —	$ —	$ —
Research, development and other related costs	14,643	13,168	13,277
Selling, general and administrative	16,911	17,843	20,185
Total stock-based compensation expense	31,554	31,011	33,462
Tax effect on stock-based compensation expense	(5,051)	(4,869)	(5,296)
Net effect on net income	$ 26,503	$ 26,142	$ 28,166

Stock-based compensation expense categorized by various equity components for the years ended December 31, 2019, 2018 and 2017 is summarized in the table below (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Employee stock options	$ 219	$ 438	$ 1,980
Restricted stock awards and units	29,031	27,974	28,909
Employee stock purchase plan	2,304	2,599	2,573
Total stock-based compensation expense	$ 31,554	$ 31,011	$ 33,462

During the years ended December 31, 2019, 2018 and 2017, the Company granted stock options covering zero, zero and 70,000 shares, respectively. The 2017 estimated per share fair value of the grant was $4.62 before estimated forfeitures.

The total fair value of restricted stock awards and units vested during the years ended December 31, 2019, 2018 and 2017 was $30.1 million, $30.4 million and $22.7 million, respectively.

The total intrinsic value of options exercised during the years ended December 31, 2019, 2018 and 2017 was $0.2 million, $1.0 million and $5.5 million, respectively. The intrinsic value is calculated as the difference between the market value on the date of exercise and the exercise price of the shares.

As of December 31, 2019, the unrecognized stock-based compensation balance after estimated forfeitures consisted of $0.1 million related to unvested stock options, to be recognized over an estimated weighted average amortization period of 1.5 years, and $40.3 million related to restricted stock awards and units, including performance-based awards and units, to be recognized over an estimated weighted average amortization period of 2.3 years.

As of December 31, 2018, the unrecognized stock-based compensation balance after estimated forfeitures related to unvested stock options was $0.3 million to be recognized over an estimated weighted average amortization period of 2.0 years and $40.6 million related to restricted stock awards and units, including performance-based awards and units, to be recognized over an estimated weighted average amortization period of 2.2 years.

The Company uses the Black-Scholes option pricing model to determine the estimated fair value of options. The fair value of each option grant is determined on the date of grant and the expense is recorded on a straight-line basis. The assumptions used in the model include expected life, volatility, risk-free interest rate, and dividend yield. The Company's determinations of these assumptions are outlined below.

Expected life – The expected life assumption is based on analysis of the Company's historical employee exercise patterns. The expected life of options granted under the ESPP represents the offering period of two years.

Volatility – Volatility is calculated using the historical volatility of the Company's common stock for a term consistent with the expected life. Historical volatility of the Company's common stock is also utilized for the ESPP.

Risk-free interest rate – The risk-free interest rate assumption is based on the U.S. Treasury rate for issues with remaining terms similar to the expected life of the options.

Dividend yield – Expected dividend yield is calculated based on cash dividends declared by the Board for the previous four quarters and dividing that result by the average closing price of the Company's common stock for the quarter. Cash dividends are not paid on options, restricted stock units or unvested restricted stock awards.

In addition, the Company estimates forfeiture rates. Forfeitures are estimated at the time of grant and revised in subsequent periods if actual forfeitures differ from those estimates. Historical data is used to estimate pre-vesting option forfeitures and record stock-based compensation expense only for those awards that are expected to vest.

The following assumptions were used to value the awards granted:

	Years Ended December 31,		
	2019*	**2018***	**2017**
Expected life (in years)	—	—	4.7
Risk-free interest rate	—	—	1.8%
Dividend yield	—	—	2.9%
Expected volatility	—	—	29.8%

*There were no options granted during the years ended December 31, 2019 and 2018.

The following assumptions were used to value the ESPP shares:

	Years Ended December 31,		
	2019	**2018**	**2017**
Expected life (years)	2.0	2.0	2.0
Risk-free interest rate	1.7 - 2.5%	2.2 - 2.7%	1.2 - 1.3%
Dividend yield	3.5 - 5.4%	3.6 - 3.9%	2.0 - 2.5%
Expected volatility	51.7 - 53.4%	39.4 - 41.7%	28.3 - 30.8%

For the years ended December 31, 2019, 2018 and 2017, an aggregate of 386,000, 306,000 and 164,000 common shares, respectively, were purchased pursuant to the ESPP.

Modifications

From time to time, the Company enters into consulting agreements with its departing employees. Some of these agreements may include continued vesting of the departing employees' stock awards and an extension of the exercise period from the standard 90 days from employment termination date to the termination of the consulting agreement. There were no modifications in 2019 and 2018, respectively. In 2017, there was one modification with the impact on the Company's financial statements deemed not to be material.

NOTE 14 – INCOME TAXES

The components of total income (loss) before taxes from continuing operations are as follows (in thousands):

	Years Ended December 31,		
	2019	2018	2017
U.S.	$ (53,346)	$ 16,684	$ 8
Foreign	(29,711)	(9,774)	(58,351)
Total income (loss) before taxes from continuing operations	$ (83,057)	$ 6,910	$ (58,343)

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

	Years Ended December 31,		
	2019	2018	2017
Current:			
U.S. federal	$ 68,772	$ 290	$ (79)
Foreign	(42,147)	22,668	16,871
State and local	94	10	77
Total current	26,719	22,968	16,869
Deferred:			
U.S. federal	(41,826)	(10,766)	(8,390)
Foreign	(4,145)	(3,191)	(10,463)
State and local	228	(338)	199
Total deferred	(45,743)	(14,295)	(18,654)
Provision for (benefit from) income taxes	$ (19,024)	$ 8,673	$ (1,785)

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts for income tax purposes.

Significant components of the Company's deferred tax assets and liabilities are as follows (in thousands):

	December 31,	
	2019	2018
Deferred tax assets		
Net operating losses	$ 10,142	$ 10,368
Research tax credits	13,475	14,717
Foreign tax credits	—	27,092
Expenses not currently deductible	14,640	14,623
Basis difference in fixed and intangible assets	3,593	3,494
Capitalized research expenses	23,785	8,965
Gross deferred tax assets	65,635	79,259
Valuation allowance	(37,243)	(41,942)
Net deferred tax assets	28,392	37,317
Deferred tax liabilities		
Revenue recognition	(32,466)	(63,367)
Operating leases	(2,665)	—
Acquired intangible assets, domestic	(17,165)	(27,323)
Acquired intangible assets, foreign	(2,171)	(7,944)
Net deferred tax liabilities	$ (26,075)	$ (61,317)

At December 31, 2019 and 2018, the Company had a valuation allowance of $37.2 million and $41.9 million, respectively, related to federal, state, and foreign deferred tax assets that the Company believes will not be realizable on a more-likely-than-not basis. The $4.7 million decrease from the prior year is primarily comprised of $27.9 million attributable to a decrease in valuation allowance recorded against tax credits, offset by $23.2 million increase in valuation allowance primarily related to U.S. federal capitalized research expenses.

The need for a valuation allowance requires an assessment of both positive and negative evidence when determining whether it is more likely than not that deferred tax assets are recoverable. Such assessment is required on a jurisdiction-by-jurisdiction basis. In making such assessment, significant weight is given to evidence that can be objectively verified such as recent earnings (or loss) history, carryback of certain tax attributes and reversals of existing taxable temporary differences. Lesser weight is given to subjective evidence such as tax-planning strategies and projected future income based on management's assumptions. After considering both positive and negative evidence, the Company released valuation allowance on U.S. federal tax credits since it was more likely than not that these tax attributes would be utilized as a result of the foreign tax refund filing. Additionally, the Company increased its valuation allowance on deferred tax assets primarily related to U.S. federal capitalized research expenses, U.S. state deferred tax assets, and certain foreign deferred tax assets based on its recent financial results and having insufficient objectively verifiable future sources of income.

In the future, the Company may release valuation allowance and recognize certain deferred tax assets depending on achievement of future profitability in relevant jurisdictions or implementation of tax planning strategies that enable the Company to utilize deferred tax assets that would otherwise be unused. Any release of valuation allowance could have the effect of decreasing the income tax provision in the period the valuation allowance is released. The Company continues to monitor the likelihood that it will be able to recover its deferred tax assets, including those for which a valuation allowance is recorded. There can be no assurance that the Company will generate profits or implement tax strategies in future periods enabling it to fully realize its deferred tax assets. The timing of recording a valuation allowance or the reversal of such valuation allowance is subject to objective factors that cannot be readily predicted in advance. Adjustments could be required in the future if the Company concludes that it is more likely than not that deferred tax assets are not recoverable. A provision for a valuation allowance could have the effect of increasing the income tax provision in the period the valuation allowance is provided.

As of December 31, 2019, the Company had federal net operating loss carryforwards of approximately $3.1 million and state net operating loss carryforwards of approximately $66.4 million. Substantially all of the federal net operating loss carryforwards are carried over from the acquired entity, DTS in 2016. The state net operating loss carryforwards are carried over from acquired entities, DTS in 2016, Ziptronix in 2015, and Siimpel Corporation in 2010. The federal net operating loss carryforwards, if not utilized, will begin to expire on various dates beginning in 2026. The state net operating loss carryforwards, if not utilized, will begin to expire on various dates beginning in 2021, and will continue to expire through 2035.

In addition, the Company has research tax credit carryforwards of approximately $1.7 million for federal purposes, which was carried over from prior years. The federal research tax credit will start to expire in 2034 and will continue to expire through 2035. The Company also has research tax credit carryforwards of approximately $15.4 million for state purposes and $0.6 million for foreign purposes, which do not expire. Under the provisions of the Internal Revenue Code, substantial ownership changes may limit the amount of net operating loss and tax credit carryforwards that can be utilized annually in the future to offset taxable income. In addition, for losses generated after December 31, 2017, the Tax Act modified the maximum deduction of net operating loss, eliminated carryback, and provided an indefinite carryforward.

A reconciliation of the statutory U.S. federal income tax rate to the Company's effective tax rate is as follows:

	Years Ended December 31,		
	2019	2018	2017
U.S. federal statutory rate	$ (17,442)	$ 1,451	$ (20,420)
State, net of federal benefit	281	59	49
Stock-based compensation expense	2,807	3,883	1,706
Executive compensation limitation	411	1,538	—
Research tax credit	(2,038)	248	(1,851)
Foreign withholding tax	10,328	33,063	14,719
Transaction costs	974	—	—
Foreign tax rate differential	1,907	474	12,112
Foreign tax credit	(7,795)	(33,554)	(13,343)
Change in valuation allowance	(8,238)	7,721	13,497
U.S. tax reform	(2,970)	(6,333)	(7,868)
Unrecognized tax benefits	2,994	300	108
Change in estimates	(1,300)	(10)	(608)
Others	1,057	(167)	114
Total	$ (19,024)	$ 8,673	$ (1,785)

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 ("Tax Act") was signed into law. The Tax Act introduced a broad range of tax reform measures that significantly changed the federal income tax laws. As of December 31, 2017, the Company recorded a provisional tax expense in the Statement of Operations of approximately $5.6 million, comprised of approximately $13.5 million tax expense from recording additional valuation allowance against federal tax credits due to certain provisions of the Tax Act, offset by approximately $7.9 million of tax benefit from the remeasurement of U.S. deferred taxes using the 21% tax rate at which the Company expects them to reverse in the future. The one-time transition tax on post-1986 foreign unremitted earnings did not have a material impact on the Company's effective tax rate. The Company continues to monitor supplemental legislation and technical interpretations of the tax law that may cause the final impact from the Tax Act to differ from the amounts previously recorded.

At December 31, 2019, the Company asserts that it will not permanently reinvest its foreign earnings outside the U.S. The Company anticipates that the cash from its foreign earnings may be used domestically to fund operations, settle a portion of the outstanding debt obligation, or used for other business needs. The accumulated undistributed earnings generated by its foreign subsidiaries was approximately $107.3 million. Substantially all of these earnings will not be taxable upon repatriation to the United States since under the Tax Act they will be treated as previously taxed income from the one-time transition tax, Global Intangible Low-Taxed Income or dividends-received deduction. The withholding taxes related to the distributable cash of the Company's foreign subsidiaries are not expected to be material.

During the fourth quarter of fiscal 2019, the Company filed a refund claim for foreign taxes previously withheld by licensees in Korea based on recent court rulings in Korea and other business factors. These withheld foreign taxes were claimed as a foreign tax credit in the U.S. As a result of the refund claim, the Company recorded a non-current income tax receivable of $65.2 million in other assets, an unrecognized tax benefit of $48.2 million recorded in other long-term liabilities, and a reduction in deferred tax assets of $17.0 million. At December 31, 2019, the Company recorded a foreign exchange loss of $0.7 million.

As of December 31, 2019, unrecognized tax benefits approximated $87.3 million, of which $82.9 million would affect the effective tax rate if recognized. As of December 31, 2018, unrecognized tax benefits approximated $33.6 million, of which $21.3 million would affect the effective tax rate if recognized. The Company believes that its unrecognized tax benefits as of December 31, 2019 will decrease by approximately $4.3 million within the next twelve months due to expiring statute of limitations. The Company anticipates that the unrecognized tax benefit, related to a future Korean withholding tax refund claim, will continue to increase in the next twelve months due to additional taxes withheld on royalty payments by Korean licensees. The increase in the unrecognized tax benefit would more-likely-than-not be offset by the income tax receivable from the future Korean withholding tax refund claim and therefore, do not expect a significant impact on the Company's tax provision.

The reconciliation of the Company's unrecognized tax benefits for the years ended December 31, 2019, 2018 and 2017 is as follows (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Total unrecognized tax benefits at January 1	$ 33,552	$ 33,506	$ 30,088
Gross increases and decreases due to tax positions taken in prior periods	—	(540)	2,457
Gross increases and decreases due to tax positions taken in the current period	54,048	586	961
Gross increases and decreases due to settlements with taxing authorities	—	—	—
Gross increases and decreases due to lapses in applicable statutes of limitations	(306)	—	—
Total unrecognized tax benefits at December 31	$ 87,294	$ 33,552	$ 33,506

It is the Company's policy to classify accrued interest and penalties related to unrecognized tax benefits in the provision for income taxes. For the years ended December 31, 2019, 2018, and 2017, the Company recognized an insignificant amount of interest and penalties related to unrecognized tax benefits. Accrued interest and penalties were $1.2 million and $0.9 million, for the years ended December 31, 2019 and 2018, respectively.

At December 31, 2019, the Company's 2014 through 2018 tax years were open and subject to potential examination in one or more jurisdictions. In addition, in the U.S., any net operating losses or credits that were generated in prior years but not yet fully utilized in a year that is closed under the statute of limitations may also be subject to examination. The Internal Revenue Service is currently in the process of completing the examination of one of the Company's domestic subsidiaries for tax year 2014. The Company estimates that the financial outcome of this examination will not be material to its Statement of Operations. In addition, the Company has submitted a withholding tax refund claim with the Korean authorities and the final outcome is not anticipated to be settled within the next twelve months.

NOTE 15 – COMMITMENTS AND CONTINGENCIES

Leases

The Company leases office and research facilities and office equipment under operating leases which expire at various dates through 2028. The terms of some of the Company's leases provide for rental payments on a graduated scale. Lease expense is recorded on a straight-line basis over the lease term. For further details, refer to "Note 8 – *Leases.*"

Purchase and Other Commitments

Under certain contractual arrangements, the Company may be obligated to pay up to approximately $10.7 million over an estimated period of approximately five years if certain milestones are achieved.

Contingencies

At each reporting period, the Company evaluates whether or not a potential loss amount or a potential range of loss is probable and reasonably estimable under the provisions of the authoritative guidance that addresses accounting for contingencies. The Company is currently unable to predict the final outcome of lawsuits to which it is a party and therefore cannot determine the likelihood of loss nor estimate a range of possible loss. An adverse decision in any of these proceedings could significantly harm the Company's business and consolidated financial position, results of operations or cash flows.

The Company and its subsidiaries are involved in litigation matters and claims in the normal course of business. In the past, the Company and its subsidiaries have litigated to enforce their respective patents and other intellectual property rights, to enforce the terms of license agreements, to protect trade secrets, to determine the validity and scope of the proprietary rights of others and to defend themselves or their customers against claims of infringement or invalidity. The Company expects to be involved, either directly or through its subsidiaries, in similar legal proceedings in the future, including proceedings regarding infringement of its patents, and proceedings to ensure proper and full payment of royalties by customers under the terms of its license agreements.

The existing and any future legal actions may harm the Company's business. For example, an adverse decision in any of these legal actions could result in a loss of the Company's proprietary rights; reduce or limit the value of the Company's licensed technology; negatively impact the Company's stock price, its business, consolidated financial position, results of operations, royalties, billings, or cash flows; subject the Company to significant liabilities; or require the Company to seek licenses from others. Furthermore, legal actions could cause an existing customer or strategic partner to cease making royalty or other payments to the Company, or to challenge the validity and enforceability of patents owned by the Company's subsidiaries or the scope of license agreements with the Company's subsidiaries, and could significantly damage the Company's relationship with such customer or strategic partner and, as a result, prevent the adoption of the Company's other technologies by such customer or strategic partner. Litigation could also severely disrupt or shut down the business operations of customers or strategic partners of the Company's subsidiaries, which in turn would significantly harm ongoing relations with them and cause the Company to lose royalty revenue.

The costs associated with legal proceedings are typically high, relatively unpredictable, and not completely within the Company's control. These costs may be materially higher than expected, which could adversely affect the Company's operating results and lead to volatility in the price of its common stock. Whether or not determined in the Company's favor or ultimately settled, litigation diverts managerial, technical, legal, and financial resources from the Company's business operations.

NOTE 16 – SEGMENT AND GEOGRAPHIC INFORMATION

The Company reports its financial results within two reportable segments: (1) Product Licensing and (2) Semiconductor and IP Licensing. There are certain corporate overhead costs that are not allocated to these reportable segments because these operating amounts are not considered in evaluating the operating performance of the Company's business segments.

The Chief Executive Officer is also the Chief Operating Decision Maker ("CODM") as defined by the authoritative guidance on segment reporting.

The Product Licensing segment is comprised of the Company's audio and imaging businesses, which the Company licenses through the DTS, HD Radio, and IMAX Enhanced brands. These licenses typically include the delivery of software and/or hardware-based solutions to the Company's customers or to their suppliers. Product Licensing revenue is derived primarily from sales into the home, automotive and mobile markets.

The Semiconductor and IP Licensing segment includes our Tessera, Invensas and Invensas Bonding Technologies subsidiaries, which license semiconductor packaging and interconnect technologies and associated IP. Semiconductor and IP Licensing revenue is derived from technology and IP licenses to semiconductor companies, foundries and packaging companies. The Company has a long history of developing and monetizing next-generation technologies, including chip-scale and multi-chip packaging solutions as well as low-temperature wafer and die bonding solutions. Today, the Company is actively developing and licensing 3D semiconductor packaging, interconnect and bonding solutions for semiconductors that are used in every day products such as smartphones, tablets, and laptops as well as servers used in datacenters. The Company also provides engineering services to its customers to assist them in their evaluation and adoption of the Company's technologies including the transition into high volume production.

The Company does not identify or allocate assets by reportable segment, nor does the CODM evaluate reportable segments using discrete asset information. Reportable segments do not record inter-segment revenue and accordingly there are none to report. The Company does not allocate other income and expense to reportable segments. Although the CODM uses operating income to evaluate reportable segments, operating costs included in one segment may benefit other segments.

The following table sets forth the Company's segment revenue, operating expenses and operating income (loss) for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Revenue:			
Product licensing segment	$ 198,124	$ 219,708	$ 167,923
Semiconductor and IP licensing segment	81,943	186,425	205,809
Total revenue	280,067	406,133	373,732
Operating expenses:			
Product licensing segment	181,804	180,727	172,745
Semiconductor and IP licensing segment	44,074	73,519	87,838
Unallocated operating expenses (1)	122,897	127,907	144,649
Total operating expenses	348,775	382,153	405,232
Operating income (loss):			
Product licensing segment	16,320	38,981	(4,822)
Semiconductor and IP licensing segment	37,869	112,906	117,971
Unallocated operating expenses (1)	(122,897)	(127,907)	(144,649)
Total operating income (loss)	$ (68,708)	$ 23,980	$ (31,500)

(1) Unallocated operating expenses consist primarily of selling, general and administrative expenses and stock-based compensation. These expenses are not allocated because these amounts are not considered in evaluating the operating performance of the Company's business segments.

Amortization and depreciation are included in segment operating income (loss) as shown below (in thousands):

	Years Ended December 31,		
	2019	2018	2017
Amortization and depreciation:			
Product licensing segment	$ 93,403	$ 93,582	$ 95,823
Semiconductor and IP licensing segment	13,264	21,544	23,308
Total amortization and depreciation	$ 106,667	$ 115,126	$ 119,131

A significant portion of the Company's revenue is derived from licensees headquartered outside of the U.S., principally in Asia, and it is expected that this revenue will continue to account for a significant portion of total revenues in future periods. The table below lists the geographic revenue from continuing operations for the periods indicated (in thousands):

	Years Ended December 31,					
	2019		2018		2017	
Japan	$ 85,833	31%	$ 88,513	22%	$ 81,688	22%
Korea	74,790	27	209,245	51	50,155	13
U.S.	74,469	26	53,245	13	164,846	44
Europe and Middle East	19,638	7	31,864	8	13,632	4
Other	25,337	9	23,266	6	63,411	17
	$ 280,067	100%	$ 406,133	100%	$ 373,732	100%

For the years ended December 31, 2019, 2018, and 2017, two, two and two customers, respectively, each accounted for 10% or more of total revenue.

As of December 31, 2019, 2018 and 2017 property and equipment, net, by geographical area are presented below (in thousands):

	December 31,		
	2019	2018	2017
U.S.	$ 28,273	$ 29,123	$ 32,862
Europe	4,391	1,533	1,019
Asia and other	213	381	561
Total	$ 32,877	$ 31,037	$ 34,442

NOTE 17 – BENEFIT PLAN

The Company maintains a 401(k) retirement savings plan that allows voluntary contributions by all eligible U.S. employees upon their hire date. Eligible employees may elect to contribute up to the maximum amount allowed under Internal Revenue Service regulations. The Company can make discretionary contributions under the 401(k) plan. During the years ended December 31, 2019, 2018 and 2017, the Company contributed approximately $3.0 million, $2.9 million, and $2.4 million, respectively, to the 401(k) plan.

NOTE 18 – SUBSEQUENT EVENTS

Declaration of a Cash Dividend

On January 30, 2020, the Board declared a cash dividend of $0.20 per share of common stock, payable on March 25, 2020, for the stockholders of record at the close of business on March 4, 2020.

Schedule II. Valuation and Qualifying Accounts for the Years Ended December 31, 2019, 2018 and 2017

	Balance at Beginning of Year	Charged (Credited) to Expenses	Charged (Credited) to Other Accounts	Balance at End of Year
Deferred income tax asset:				
Valuation allowance				
2017	$ 12,847	$ 13,925	$ 5,260	$ 32,032
2018	$ 32,032	$ 2,794	$ 7,116	$ 41,942
2019	$ 41,942	$ (4,699)	$ —	$ 37,243

	Balance at Beginning of Year	Charged (Credited) to Expenses	Charged (Credited) to Other Accounts	Balance at End of Year
Accounts receivable:				
Allowance for doubtful accounts				
2017	$ —	$ 2,404	$ (1,223)	$ 1,181
2018	$ 1,181	$ 417	$ (819)	$ 779
2019	$ 779	$ (74)	$ (139)	$ 566

EXHIBIT INDEX

Exhibit Number	Exhibit Description
2.1*	Agreement and Plan of Merger and Reorganization, dated December 18, 2019, by and among the Registrant, TiVo Corporation, XRAY Merger Sub Corporation, TWOLF Merger Sub Corporation and XRAY-TWOLF HoldCo Corporation (filed as Exhibit 2.1 to the Registrant's Current Report on Form 8-K, filed December 24, 2019, and incorporated herein by reference)
3.1	Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
3.2	Certificate of Amendment of the Restated Certificate of Incorporation dated as of February 22, 2017 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed February 27, 2017, and incorporated herein by reference)
3.3	Amended and Restated Bylaws, dated December 1, 2016 (filed as Exhibit 3.2 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
3.4	Amendment to the Amended and Restated Bylaws, dated as of December 6, 2016 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed December 7, 2016, and incorporated herein by reference)
3.5	Amendment to the Amended and Restated Bylaws, dated as of April 27, 2017 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed May 3, 2017, and incorporated herein by reference)
3.6	Amendment to the Amended and Restated Bylaws, effective as of February 1, 2018 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed February 7, 2018, and incorporated herein by reference)
3.7	Amendment to the Amended and Restated Bylaws, effective as of April 27, 2018 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed May 3, 2018, and incorporated herein by reference)
3.8	Amendment to the Amended and Restated Bylaws, effective as of December 15, 2018 (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed October 30, 2018, and incorporated herein by reference)
10.1	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed December 7, 2016, and incorporated herein by reference)
10.2+	2017 Performance Bonus Plan for Executive Officers and Key Employees (filed as Appendix A to the Registrant's Definitive Proxy Statement, filed on March 15, 2017 and incorporated herein by reference)
10.3+	Employee Stock Purchase Plan, as amended and restated effective July 31, 2013 (filed as Appendix B to the Definitive Proxy Statement of the Predecessor Registrant, filed April 16, 2013, and incorporated herein by reference)
10.4+	Second Amended and Restated International Employee Stock Purchase Plan (filed as Appendix A to the Registrant's Definitive Proxy Statement, filed March 20, 2019, and incorporated herein by reference)
10.5+	Sixth Amended and Restated 2003 Equity Incentive Plan (filed as Appendix A to the Predecessor Registrant's Definitive Proxy Statement, filed March 18, 2015, and incorporated herein by reference)
10.6+	First Amendment to Sixth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.1 to the Predecessor Registrant's Quarterly Report on Form 10-Q, filed May 2, 2016, and incorporated herein by reference)
10.7+	Form of Stock Option Agreement for the Tessera Technologies, Inc. Fourth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.2 to the Predecessor Registrant's Registration Statement on Form S-8, filed June 13, 2008, and incorporated herein by reference)
10.8+	Form of Stock Option Agreement for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.2 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.9+	Form of Stock Option Agreement (Board) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.3 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.10+	Form of Stock Option Agreement (Romania) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.4 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)

10.11+	Form of Stock Option Agreement (International) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.2 to the Predecessor Registrant's Quarterly Report on Form 10-Q, filed November 4, 2010, and incorporated herein by reference)
10.12+	Form of Stock Option Agreement for the Tessera Technologies, Inc. Sixth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.2 to the Predecessor Registrant's Quarterly Report on Form 10-Q, filed August 5, 2015, and incorporated herein by reference)
10.13+	Form of Restricted Stock Agreement for the Tessera Technologies, Inc. Fourth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.3 to the Predecessor Registrant's Registration Statement on Form S-8, filed June 13, 2008, and incorporated herein by reference)
10.14+	Form of Restricted Stock Agreement for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.5 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.15+	Form of Restricted Stock Agreement (Israel) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.6 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.16+	Form of Restricted Stock Agreement (Romania) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.7 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.17+	Form of Restricted Stock Agreement for the Tessera Technologies, Inc. Sixth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.3 to the Predecessor Registrant's Quarterly Report on Form 10-Q, filed August 5, 2015, and incorporated herein by reference)
10.18+	Form of Deferred Stock Agreement for the Tessera Technologies, Inc. Fourth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.4 to the Predecessor Registrant's Registration Statement on Form S-8, filed June 13, 2008, and incorporated herein by reference)
10.19+	Form of Deferred Stock Agreement for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.8 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.20+	Form of Deferred Stock Agreement (Performance Vesting) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.9 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.21+	Form of Deferred Stock Agreement (Ireland) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.10 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.22+	Form of Deferred Stock Agreement (Israel) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.11 to the Predecessor Registrant's Registration Statement on Form S-8, filed August 6, 2010, and incorporated herein by reference)
10.23+	Form of Deferred Stock Agreement (International) for the Tessera Technologies, Inc. Fifth Amended and Restated 2003 Equity Incentive Plan (filed as Exhibit 10.1 to the Predecessor Registrant's Quarterly Report on Form 10-Q, filed November 4, 2010, and incorporated herein by reference)
10.24+	Employment and Severance Agreement, dated April 28, 2017, by and between the Registrant and Jon Kirchner (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q, filed August 2, 2017, and incorporated herein by reference)
10.25+	Form of Severance Agreement, dated February 25, 2019, by and between the Registrant and each of Robert Andersen, Geir Skaaden, and Paul Davis (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q, filed May 8, 2019 and incorporated herein by reference)
10.26+	Form of Change in Control Severance Agreement, dated February 25, 2019, by and between the Registrant and each of Robert Andersen, Geir Skaaden, and Paul Davis (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q, filed May 8, 2019 and incorporated herein by reference)
10.27+	Form of Severance Agreement, dated October 16, 2019, by and between the Registrant and Murali Dharan (filed as Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q, filed May 8, 2019 and incorporated herein by reference)
10.28+	Form of Change in Control Severance Agreement, dated October 16, 2019, by and between the Registrant and Murali Dharan (filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q, filed May 8, 2019 and incorporated herein by reference)

10.29+	Non-Employee Director Compensation Policy (filed as Exhibit 10.3 to the Registrant's Quarterly Report on Form 10-Q, filed August 2, 2017, and incorporated herein by reference)
10.30	Credit Agreement, dated as of December 1, 2016, among Tessera Holding Corporation (f/k/a Tempe Holdco Corporation), the lenders party thereto and Royal Bank of Canada, as administrative agent and collateral agent (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
10.31	Amendment No. 1 to Credit Agreement, dated as of January 23, 2018, among the Registrant, the other loan parties thereto, the participating lenders, and Royal Bank of Canada, as administrative agent, collateral agent and fronting bank (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed January 24, 2018, and incorporated herein by reference)
10.32	Guaranty, dated December 1, 2016, by the Registrant's subsidiary guarantors in favor of Royal Bank of Canada, as administrative agent (filed as Exhibit 10.2 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
10.33	Security Agreement, dated December 1, 2016, among the Registrant, Royal Bank of Canada, as collateral agent, and the other pledgors party thereto (filed as Exhibit 10.3 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
10.34	Commitment Letter, dated December 18, 2019, by and among the Registrant, TiVo Corporation, Bank of America, N.A., BofA Securities, Inc. and Royal Bank of Canada (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed December 24, 2019, and incorporated herein by reference)
10.35	Supplement to Commitment Letter and Fee Letter, dated January 3, 2020, by and among the Registrant, TiVo Corporation, Bank of America, N.A., Royal Bank of Canada, and Barclays Bank PLC (filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed January 7, 2020, and incorporated herein by reference)
10.36+	DTS, Inc. 2014 New Employee Incentive Plan (filed as Exhibit 10.1 to the Current Report on Form 8-K of DTS, Inc., filed August 20, 2014, and incorporated herein by reference)
10.37+	Amendment No. 1 to DTS, Inc. 2014 New Employee Incentive Plan (filed as Exhibit 99.3 to Registration Statement on Form S-8 of DTS, Inc., filed August 10, 2015, and incorporated herein by reference)
10.38+	Amendment No. 2 to DTS, Inc. 2014 New Employee Incentive Plan (filed as Exhibit 99.3 to Registration Statement on Form S-8 of DTS, Inc., filed November 9, 2015, and incorporated herein by reference)
10.39+	DTS, Inc. 2013 Employee Stock Purchase Plan (filed as Exhibit 99.1 to Registration Statement on Form S-8 of DTS, Inc., filed August 16, 2013, and incorporated herein by reference)
10.40+	DTS, Inc. 2013 Foreign Subsidiary Employee Stock Purchase Plan (filed as Exhibit 99.2 to Registration Statement on Form S-8 of DTS, Inc., filed August 16, 2013, and incorporated herein by reference)
10.41+	DTS, Inc. 2012 Equity Incentive Plan and Amendment No. 1 (filed as Appendix A to Definitive Proxy Statement on Schedule 14A of DTS, Inc., filed April 14, 2015, and incorporated herein by reference)
10.42+	SRS Labs, Inc. 2006 Stock Incentive Plan, as amended and restated on August 9, 2012 (filed as Exhibit 4.4 to Registration Statement on Form S-8 of DTS, Inc., filed August 13, 2012, and incorporated herein by reference)
14.1	Code of Business Conduct and Ethics, dated December 1, 2016 (filed as Exhibit 14.1 to the Registrant's Current Report on Form 8-K, filed December 1, 2016, and incorporated herein by reference)
21.1	List of subsidiaries
23.1	Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm
24.1	Power of Attorney (see signature page to this Annual Report on Form 10-K)
31.1	Certification of the Chief Executive Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934
31.2	Certification of the Chief Financial Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934
32.1	Certification of the Chief Executive Officer and Chief Financial Officer pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	Inline 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 and contained in Exhibit 101)

+	Indicates a management contract or compensatory plan or arrangement.
*	The exhibits and schedules to this agreement have been omitted in reliance on Item 601(b)(2) of Regulation S-K promulgated by the SEC, and a copy thereof will be furnished supplementally to the SEC upon its request. Readers are cautioned that the representations and warranties set forth in this agreement are qualified by those schedules, and should not be relied upon as accurate or complete without reference to those schedules

Item 16. Form 10-K Summary

None.

SIGNATURES

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

Dated: February 18, 2020

Xperi Corporation

By: /s/ Jon Kirchner
Jon Kirchner
Chief Executive Officer

POWER OF ATTORNEY

Each person whose individual signature appears below hereby authorizes and appoints Jon Kirchner and Robert Andersen, and each of them, with full power of substitution and resubstitution and full power to act without the other, as his true and lawful attorney-in-fact and agent to act in his name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorneys-in-fact and agents or any of them or their or his substitute or substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Exchange Act, 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
/s/ Jon Kirchner **Jon Kirchner**	Chief Executive Officer and Director (Principal Executive Officer)	February 18, 2020
/s/ Robert J. Andersen **Robert J. Andersen**	Executive Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	February 18, 2020
/s/ Richard S. Hill **Richard S. Hill**	Chairman of the Board of Directors	February 18, 2020
/s/ Darcy Antonellis **Darcy Antonellis**	Director	February 18, 2020
/s/ Dave Habiger **Dave Habiger**	Director	February 18, 2020
/s/ V. Sue Molina **V. Sue Molina**	Director	February 18, 2020
/s/ George A. Riedel **George A. Riedel**	Director	February 18, 2020
/s/ Christopher A. Seams **Christopher A. Seams**	Director	February 18, 2020

Exhibit 21.1

SUBSIDIARIES OF THE REGISTRANT

All In Media Pty Ltd, an Australia corporation
DLLNI LIMITED, a company organized under the laws of England and Wales
DTS Licensing Limited, an Irish limited corporation
DTS, Inc., a Delaware corporation
DTS International Services GmbH (Germany)
FotoNation Limited, an Irish limited corporation
FotoNation SRL, a Romanian limited liability corporation
Guangzhou DTS Digital Theater Systems, Co. Ltd., a company organized under the People's Republic of China
iBiquity Digital Corporation, a Delaware corporation
Invensas Bonding Technologies Inc. a Delaware corporation
Invensas Corporation, a Delaware corporation
Phorus, Inc., a Delaware corporation
Tessera Advanced Technologies, Inc., a Delaware corporation
Tessera Intellectual Property Corp., a Delaware corporation
Tessera Technologies, Inc., a Delaware corporation
Tessera, Inc., a Delaware corporation
Perceive Corporation, a Delaware Corporation
Xcelsis Corporation, a Delaware Corporation

The names of other subsidiaries are omitted. Such subsidiaries would not, if considered in the aggregate as a single subsidiary, constitute a significant ubsidiary within the meaning of Item 601(b)(21)(ii) of Regulation S-K.

EXHIBIT 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-231294, 333-224652, 333-219565 and 333-214862) and Post-Effective Amendments No.1 on Form S-8 (333-137933, 333-112238, 333-151659, 333-168597, 333-116369, 333-190138, 333-115311, 333-131457 and 333-195948) of Xperi Corporation of our report dated February 18, 2020 relating to the financial statements, financial statement schedule, and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

San Jose, CA
February 18, 2020

Exhibit 31.1

Certification of the Chief Executive Officer
Pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934

I, Jon Kirchner, certify that:

1. I have reviewed this annual report on Form 10-K of Xperi Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

February 18, 2020	/s/ Jon Kirchner
	Jon Kirchner
	Chief Executive Officer

Exhibit 31.2

Certification of the Chief Financial Officer
Pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934

I, Robert Andersen, certify that:

1. I have reviewed this annual report on Form 10-K of Xperi Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 18, 2020

/s/ Robert Andersen

Robert Andersen
Executive Vice President and Chief Financial Officer

Exhibit 32.1

CERTIFICATION PURSUANT TO
RULE 13a-14(b) OF THE SECURITIES EXCHANGE ACT OF 1934
AND 18 U.S.C. SECTION 1350

In connection with the Annual Report of Xperi Corporation, a Delaware corporation (the "Company"), on Form 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission (the "Report"), I, Jon Kirchner, Chief Executive Officer, certify, pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Jon Kirchner

Jon Kirchner
Chief Executive Officer
February 18, 2020

CERTIFICATION PURSUANT TO
RULE 13a-14(b) OF THE SECURITIES EXCHANGE ACT OF 1934
AND 18 U.S.C. SECTION 1350

In connection with the Annual Report of Xperi Corporation, a Delaware corporation (the "Company"), on Form 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission (the "Report"), I, Robert Andersen, Chief Financial Officer of the Company, certify, pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Robert Andersen

Robert Andersen
Executive Vice President and Chief Financial Officer
February 18, 2020

A signed original of this written statement required by Rule 13a-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. Section 1350 has been provided to the Registrant and will be retained by the Registrant and furnished to the Securities and Exchange Commission or its staff upon request.