UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2019

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO**

Commission File Number 001-38952

CAMBIUM NETWORKS CORPORATION

(Exact name of Registrant as specified in its Charter)

Cayman Islands **(State or other jurisdiction of incorporation or organization)**	**Not Applicable** **(I.R.S. Employer Identification No.)**
3800 Golf Road, Suite 360 **Rolling Meadows, Illinois** **(Address of principal executive offices)**	**60008** **(Zip Code)**

Registrant's telephone number, including area code: (345) 943-3100

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Ordinary shares, $0.0001 par value	CMBM	Nasdaq Global 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 15(d) of the Act. YES ☐ NO ☒

Indicate by check mark whether the Registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or 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, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☐
Emerging growth company	☒		

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

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

The aggregate market value of the ordinary shares held by non-affiliates on June 28, 2019 (the last business day of the registrant's most recently completed second fiscal quarter), based on the last sale price of the common shares on that date of $9.59 was $55,769,964. For purposes of this calculation, shares held by Vector Capital and our Chief Executive Officer are deemed to be affiliates of the registrant and are excluded from the calculation.

As of March 18, 2020, there were 25,680,831 shares of the registrant's ordinary shares outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement for the 2020 Annual Meeting of Stockholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2019.

Table of Contents

Note regarding forward-looking statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the federal securities laws. All statements other than statements of historical fact contained in this Annual Report on Form 10-K, including statements regarding our future results of operations and financial position, business strategy and plans and objectives of management for future operations, are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

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

- the unpredictability of our operating results;
- our inability to predict and respond to emerging technological trends and network operators' changing needs;
- our reliance on third-party manufacturers, which subjects us to risks of product delivery delays and reduced control over product costs and quality;
- our reliance on distributors and value-added resellers for the substantial majority of our sales;
- the impact of actual or threatened health epidemics and other outbreaks;
- the inability of our third-party logistics and warehousing providers to deliver products to our channel partners and network operators in a timely manner;
- the quality of our support and services offerings;
- our expectations regarding outstanding litigation;
- our distributors' and channel partners' inability to attract new network operators or sell additional products to network operators that currently use our products;
- the difficulty of comparing or forecasting our financial results on a quarter-by-quarter basis due to the seasonality of our business;
- our limited or sole source suppliers' inability to produce third-party components to build our products;
- the technological complexity of our products, which may contain undetected hardware defects or software bugs;
- our channel partners' inability to effectively manage inventory of our products, timely resell our products or estimate expected future demand;
- credit risk of our channel partners, which could adversely affect their ability to purchase or pay for our products;
- our inability to manage our growth and expand our operations;
- unpredictability of sales and revenues due to lengthy sales cycles;
- our inability to maintain an effective system of internal controls, produce timely and accurate financial statements or comply with applicable regulations;
- our reliance on the availability of third-party licenses;
- risks associated with international sales and operations;
- current or future unfavorable economic conditions, both domestically and in foreign markets; and
- our inability to obtain intellectual property protections for our products

The foregoing list may not contain all of the forward-looking statements made in this Annual Report on Form 10-K.

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

Trademarks and Service Marks

“Cambium” , “Cambium Networks”, “cnPilot”, “cnMaestro”, ‘cnMedusa”, “cnArcher”, “cnReach”, “cnHeat”, “cnRanger”, “LinkPlanner”, “Xirrus”, the Cambium and Xirrus logos and other trademarks or service marks of Cambium Networks, Ltd. appearing in this Annual Report are the Property of Cambium Networks Corporation. This Annual Report contains additional trade names, trademarks and service marks, which are the property of their respective owners.

PART I

Item 1. Business.

Overview

We provide wireless broadband networking infrastructure solutions for network operators, including medium-sized wireless internet service providers, enterprises and government agencies. Our scalable, reliable and high-performance solutions create a purpose-built wireless fabric which connects people, places and things across distances ranging from two meters to more than 100 kilometers, indoors and outdoors, using licensed and unlicensed spectrum, at attractive economics.

Our wireless fabric includes intelligent radios, smart antennas, radio frequency, or RF, algorithms, wireless-aware switches and our cloud-based network management software. Our embedded proprietary RF technology and software enables automated optimization of data flow at the outermost points in the network, which we refer to as the "intelligent edge." This intelligent edge offers network operators increased performance, visibility, control and management, as well as the ability to efficiently transfer large amounts of data back to enterprise data centers for fast and efficient analysis and decision-making even in conditions characterized by a high degree of interfering signals generated both within the network or from outside sources, which we refer to as noise.

Our solutions are deployed by medium-sized wireless internet service providers and enterprises, including petrochemical, military, state and local government, education, hospitality, rail, utility, industrial and other network operators that use our technology to connect a wide range of network assets, from traditional offices to complex sensor networks. Network operators deploy our enterprise-grade solutions to take advantage of their scalability, intelligence, reliability, attractive economics and ease of deployment:

- ***Superior outdoor scalability.*** Our solutions scale to greater density for outdoor applications because of their leading spectral efficiency.
- ***Embedded network intelligence.*** Our solutions have embedded intelligence, utilizing software and RF algorithms that work together to optimize network performance. This intelligence allows networks to adapt and evolve as network requirements vary, environments change, and network footprints grow over time.
- ***Reliable wireless connectivity in congested environments.*** Our solutions deliver superior reliability enabled by our technology's frequency reuse capabilities, embedded dynamic spectrum optimization and dynamic filtering abilities.
- ***High quality at attractive economics.*** Our solutions improve economics for network operators by supporting a large number of customer premise equipment, or CPE, per access point while providing enterprise-grade performance and quality. We reduce ongoing management costs through device reliability and embedded software that independently manages and resolves network performance issues.
- ***Ease of deployment and simplicity to scale the network.*** Network operators can utilize our cloud-based software to help design, install and manage their networks from cloud-to-tower-to-edge. Our cloud-based network management software offers full lifecycle management of a network through a single pane of glass, reducing the complexity of network operations and the onboarding of large numbers of devices.

Our products are typically deployed by medium-sized service providers, such as wireless internet service provider networks serving from 5,000 to over 200,000 subscribers, enterprise networks and sensor heavy industrial networks. We estimate that medium-sized internet service providers contributed approximately half of our revenues in 2017, 2018 and 2019.

We market and sell our solutions through our global channel partner network, which drives a substantial majority of our revenues. We sell our solutions as one-time sales, although a majority of our revenues in a given period typically is generated by purchases from network operators that have previously purchased our products. Growth from these network operators is driven by expansion within existing networks and in new territories, replacement of competitor products with our solutions, deployment of new and incremental use cases and, in the case of local governments, mandated to offer fixed broadband wireless to all of their citizens.

We have experienced rapid revenue growth over the last several years and we have shipped more than six million devices since 2012, including over 1.5 million in 2019, to more than 10,000 network operators in over 145 countries. For 2017, 2018 and 2019, our revenues were $216.7 million, $241.8 million, and $267.0 million, respectively. During the same periods, our net income (loss) was $9.8 million, $(1.5) million, and $(17.6) million, respectively.

Industry

According to Cisco Annual Internet Report (2018-2023), globally, the total number of Internet users is projected to grow from 3.9 billion in 2018 to 5.3 billion by 2023 at a compound annual growth rate ("CAGR") of 6%. Mobile-to-Mobile connections will be the fastest-growing device and connections category, growing nearly 2.4-fold during the forecast period (19% CAGR) to 14.7 billion connections by 2023. Wi-Fi hotspots will grow four-fold from 2018 to 2023. Globally, there will be nearly 628 million public Wi-Fi hotspots by 2023, up from 169 million hotspots in 2018. We believe that growth in data traffic will be predominately driven by proliferation of connected devices, applications and sensors for both service provider and enterprise use cases. For example:

- Consumers are using connected devices to access cloud applications, stream media-rich content and connect to friends and family utilizing wireless connectivity.
- Enterprises are increasingly deploying their own wireless broadband infrastructure to provide individuals access to, and machines and other devices connectivity with, corporate networks, data centers and cloud applications.
- Industrial enterprises are using wireless broadband to help replace periodic, manual system monitoring with hundreds of wireless sensors and cameras that can monitor key production activities in real-time for safety, productivity and security. For example, wireless connectivity is allowing industrial enterprises real-time comprehensive monitoring of operations across a field of onshore facilities or offshore platforms to increase both the efficiency and safety of industrial operations.

The growing adoption of wireless networks is driving massive amounts of data that is being analyzed locally at the edge or at enterprise or cloud data centers. This requires greater wireless connectivity to capture and evaluate the data locally or to backhaul large amounts of data to a data center. Local operations centers or distant corporate data centers must also communicate with the edge devices to optimize operations. For example, when data is sent back to an operations center that identifies potential equipment overheating, that command center can quickly transmit a data request directly to the machine to analyze and resolve the issue or to a technician to rapidly address the developing situation.

Wireline broadband through cable, DSL and optical networks provides efficient bulk bandwidth transport to densely populated metropolitan areas but can be cost prohibitive in lower-density environments and rural areas. Wireline broadband also lacks real-time adaptability required for industrial networks and faces practical limitations in delivering connectivity to constantly evolving sensor and device networks. Similarly, many existing, more affordable wireless network solutions lack the performance, scalability, reliability and support to provide enterprise-grade IT infrastructure required for critical business applications.

Both wireless internet service providers and enterprises in lower-density, non-metropolitan areas require infrastructure that delivers always-on, high-speed wireless bandwidth for the transmission of large amounts of data in a wide variety of challenging conditions such as noisy spectrum or terrain that can impede wireless broadband communications, such as bodies of water or forests. Carrier-grade wireless infrastructure, primarily used in metropolitan networks, is generally ill-suited to these deployments because the size of the deployment does not justify the high equipment expense and management costs. Many existing wireless solutions are limited by their ability to deliver real-time adaptability, scalability, efficient use of spectrum, network reliability and economical use cases:

- ***Limited real-time adaptability***. Wireless network footprints are continually changing due to individuals moving within a network, rapidly changing environments in an industrial footprint and expanding use cases or functionality. Many wireless solutions lack the software and RF technology to continually optimize performance of rapidly evolving network infrastructure and in noisy conditions.
- ***Lack of network scalability***. Current wireless solutions often struggle to scale primarily because they lack end-to-end management capabilities and integrated RF algorithms in the software. Software is required to efficiently plan, synchronize and optimize large-scale deployments of wireless broadband, while mitigating self-interference. Existing solutions are typically provisioned manually and managed by spreadsheets or management tools developed by customers internally. Real-time, efficient management requires embedded software and technology capable of optimizing network performance at the edge in varying environmental conditions.
- ***Inefficient use of spectrum***. Many existing solutions do not contain data path optimization technologies that allow for efficient use of frequency channels and available spectrum. This leads to performance degradation and limits the number of users and devices to which the network can deliver quality access.
- ***Lack of network reliability in areas with congested spectrum***. Many existing solutions struggle with interference in high noise environments because they cannot reuse frequencies to expand available channels for traffic. These solutions also do not include software that identifies congested channels and automatically switches traffic to channels with less congestion. Inability to reuse frequencies or to recognize congested channels can degrade performance and limit available bandwidth.
- ***Uneconomical for certain use cases***. Existing fixed wireless broadband solutions can be cost-prohibitive because of their inability to serve a high concentration of CPE without the deployment of a high number of access points. Additionally, many existing solutions fail because of a lack of software intelligence to foresee upcoming issues and an inefficient path to resolution for issues given limited services and support capabilities.

Our solutions

We offer fixed wireless broadband networking infrastructure solutions differentiated by scalability, embedded intelligence, reliability, high quality at attractive economics and ease of deployment. Our enterprise-grade solutions provide outdoor and indoor capabilities and leading spectral efficiency that reduces self-interference and optimizes spectral efficiency and frequency reuse across the network.

Our Point-to-Point, or PTP, solutions are typically connected to high-speed, high-bandwidth wireline networks, and provide wireless broadband backhaul to facilities or Point-to-Multipoint, or PMP, access points deployed throughout a network over distances of more than 100 kilometers and at more than 2 Gbps. Our PMP solutions extend wireless broadband access from tower mounted access points to CPE providing broadband access to residences and enterprises covering wide areas with a range of 10 to 30 kilometers. Our PMP solutions are increasingly used to backhaul video surveillance systems. Our cnPilot and Xirrus Wi-Fi solutions provide distributed access to individual users in indoor settings, such as office complexes, and outdoor settings, such as athletic stadiums, over distances as short as two meters with high capacity. Our cnReach solutions offer narrow-band connectivity typically using licensed spectrum below 1 GHz and typically used by industrial customers connecting remote field operations supporting sensors and devices at the network edge. Our embedded proprietary RF technology and software enables automated optimization of data flow at the outermost points in the network. Our cnMatrix cloud-managed wireless-aware switching solution provides the intelligent interface between wireless and wired networks.

Our competitive strengths

We have a number of competitive strengths, including the following:

- ***Wireless fabric that enables fast and efficient scalability***. Our solutions allow network operators to densify their networks with incremental access points that scale subscriber support in a linear manner without compromise to quality of service.
- ***Advanced RF signal algorithms***. Our RF algorithms drive network performance by employing technologies such as frequency reuse, congestion-based channel switching and noise filtering.
- ***Broad applicability of our wireless fabric***. Our technology has broad application across a wide range of connectivity use cases, and our core technologies underlying the wireless fabric offer broad extensibility to new markets such as Wi-Fi and Industrial Internet of Things, or IIoT, solutions.
- ***Network management software platform built for scale***. Our cloud-based network management software increases ease of deployment and usage through easy provisioning, configuration, monitoring and complete network visualization, with the ability to support over 100,000 devices.
- ***Culture of constant innovation combined with high velocity product development and service***. We pride ourselves in our strong work ethic and focus on providing innovative products and first-class service to network operators. Our employees are united by our mission to eliminate the "digital divide" by building innovative products to connect underserved and developing communities.

Market opportunity

The majority of our revenues today come from PTP and PMP solutions. According to Sky Light Research, the PTP Microwave and Millimeter Wave market was estimated to be $3.58 billion in 2019. According to QYResearch, the PMP market was estimated to be $0.75 billion in 2019. We entered into the Wi-Fi market in 2016 and it has become a meaningful portion of our revenues. According to IDC, a market research firm, the enterprise WLAN market is estimated to be $7.0 billion in 2020. In 2018, we entered the Ethernet switching market, although to date our sales in this market have not been material. According to IDC, the non-datacenter Ethernet switching market is estimated to be $14.7 billion in 2020. Combining these served markets, our addressable market for 2020 exceeds $25.0 billion. In 2017, we introduced our cnReach IIoT products, and while the market remains at an early stage of development, we believe this market presents a significant commercial opportunity in the longer term.

Our growth strategy

The key elements of our growth strategy include:

- ***Continued investment in wireless fabric while expanding into new markets***. We are investing in our wireless fabric technology to expand the breadth of our solutions and to take advantage of new frequencies and communication standards.
- ***Expand our software capabilities***. We will continue to invest in our embedded software capabilities which include GPS synchronization, dynamic optimization and filtering technologies that facilitate the intelligent edge. We also plan to invest in cnMaestro, our cloud-based network management software platform, to improve functionality, ease of deployment and operations.

- ***Drive greater penetration in our existing base***. We intend to work collaboratively with key network operators to evaluate new use cases as these network operators expand their geographical footprint into new territories and increase their deployment of our products.
- ***Deepen and expand channel and network operator relationships***. We intend to deepen and expand our relationships in our channel, which includes over 6,800 channel partners as of December 31, 2019 and received CRN Magazine's five star rating in 2017, 2018 and 2019, which is its highest ranking awarded. We intend to invest in training and education for these channel partners while fostering new relationships with incremental channel partners. Additionally, in order to deepen and broaden our network operator relationships, we will continue to invest in our sales and marketing organization for both direct and channel engagements.
- ***Position portfolio to take advantage of proliferation of higher-speed wireless connectivity.*** As wireless networks transition from 4G to 5G technology, fixed wireless will be used more frequently in higher density environments. We intend to continue investing in and positioning our portfolio to pursue opportunities in high density environments as these markets move towards fixed wireless technology that is differentiated by reliability in congested environments.

Our technology and products

Cambium Network Product Portfolio Summary						
Network Management	cnMaestro - Cloud-Based Management Software					
Switching	cnMatrix - Ethernet Enterprise Switching					
Product Platform	PTP 820	PTP 670/700	PMP 450	ePMP	cnPilot	cnReach
Design Focus	Licensed Microwave and mmWave Backhaul	Sub-6 and 7/8 GHz Backhaul Performance	Scalability for Multipoint networks	Price/Performance PTP and PMP Leadership	Configurable, Cloud-managed, High performance Wi-Fi	Licensed Narrowband in rugged I/O rich package
Throughput	10+ Gbps	500 Mbps	1.3 Gbps/ sector	200 Mbps/ sector	250 Mbps/ AP	KB to MB
Spectrum (GHz except as noted)	6 - 38 71 - 86	4.4 - 5.9 7.1 - 8.5	900 MHz, 2.4, 3.5, 3.6, 4.9 - 5.9	2.4, 4.9, 5, 6.4	2.4, 5	220, 450, 700, 900 MHz

We offer a portfolio of fixed wireless broadband solutions that connect people, places and things from distances of two meters to more than 100 kilometers, delivering data rates that range from kilobytes per second to over 2 gigabytes per second, operating indoor and outdoor and utilizing licensed and unlicensed spectrum. The elements of our wireless fabric can be architected to meet a broad range of use cases and needs of network operators. Since 2012, we have shipped over 6 million devices. Our products are designed to support more CPE per access point and maximize uptime, providing an attractive total cost of ownership for network operators while delivering a reliable, scalable, flexible and easily managed platform with differentiated performance.

Our products can be categorized into our PTP backhaul, PMP distribution, Wi-Fi access, cnMatrix switching, and cnReach IIoT solutions. We also offer a number of other network management and monitoring tools, such as cnMaestro, XMS Cloud, LINKPlanner, cnHeat, and cnArcher, to further improve ease of use and network performance.

Point-to-Point backhaul solutions

Our PTP solutions are deployed globally and have proven to reliably operate in formidable and demanding environments. For example, we used PTP 650 radios to establish high quality connectivity over 245 kilometers between Pikes Peak, Colorado and Cheyenne, Wyoming, delivering real-time voice, video and data. We offer PTP solutions that are designed to operate in unlicensed spectrum from 900 MHz to 5.9 GHz and in licensed spectrum from 6-38 GHz. In addition, our PTP700 operates in NATO Band IV from 4.4-5.9 GHz, as well as in the 7 GHz and 8 GHz bands, and meets stringent federal operating, performance and security standards.

Point-to-Multipoint distribution solutions

Our PMP portfolio is composed of the PMP and ePMP distribution and access solutions that enable network operators to provide high-speed wireless broadband in a wide range of applications, ranging from connecting a small network of CCTV cameras, to deploying networks on hundreds of oil pads, to providing broadband access to low-density urban and rural communities. Our PMP and ePMP solutions offer differentiated spectral efficiency, which enables high data rates and efficient utilization of RF spectrum, as well as GPS synchronization and dynamic interference filtering to optimize performance in noisy conditions. We also offer Massive Multi-User Multi-Input Multi-Output technology and proprietary beamforming sector antennas to enable densification of CPE within a network. Together, these PMP distribution solutions allow networks to scale without compromise, from a single access point and a handful of CPE to networks with hundreds of thousands of subscriber radios, both using the identical products and technologies.

Wi-Fi access solutions

Our cnPilot and Xirrus enterprise and service provider Wi-Fi access points are easily deployed within both new and existing wireless local area networks, including in existing networks with equipment from other manufacturers. Our products include enterprise access points for both indoor and outdoor use cases, as well as internet service provider-managed home gateways. Our adaptive architecture provides controller functionality and services with high agility for the network operator.

cnMatrix Ethernet enterprise switching solutions

Our cnMatrix Ethernet Enterprise Switching solutions simplify network deployment and operation. When deployed with cnPilot WLAN access points and the cnMaestro management system, network operators have an affordable, feature-rich, high quality unified wired/wireless enterprise grade network. Our cnMatrix solutions incorporate policy-based automation, automated device segmentation, enhanced power management, and are cloud-managed, to enhance performance, security, and end-user satisfaction while reducing costs.

cnReach IIoT solutions

Our cnReach IIoT solutions offer connectivity for distributed sensors and controls across industrial deployments, delivering real-time monitoring, measurement and analytics to optimize system performance. Our products can be deployed in a variety of industrial verticals such as oil and gas, electrical utilities, water management, rail and transportation operations and smart cities. cnReach focuses on supervisory control and data acquisition systems for process control and monitoring, providing affordable, narrowband wireless connectivity to support distribution automation, substation switches, circuit control and telemetry.

cnMaestro and network management tools

Our cloud-based cnMaestro network management platform and our Xirrus XMS Cloud platform provide users with an integrated, intelligent, easy to use tool for end-to-end network management of our portfolio from the network operating center to individual CPE on a single pane of glass. cnMaestro's interface allows users to easily onboard large numbers of new devices, configure existing devices, monitor the entire network and troubleshoot end-to-end.

LINKPlanner is a comprehensive tool, developed over the past 10 years, used to plan PTP and PMP networks. LINKPlanner allows users to visualize and analyze hypothetical network deployment scenarios to evaluate performance and reliability allowing for cost-effective expansion and deployment of their networks. cnArcher is a smartphone app that accelerates installation and deployment of our products by field technicians.

Network operators and distribution channel

We sell our solutions globally through out channel partners to wireless Internet service providers, enterprises and government agencies. Wireless Internet service providers using our products are generally medium-sized service providers serving between 5,000 and more than 200,000 subscribers. Enterprises using our products are in industries such as oil and gas, agriculture, mining, utilities, transportation, surveillance, hospitality, education and general corporate enterprises. Government entities using our products include local government agencies, federal agencies and defense organizations. The following table provides an illustrative list of network operators in three sectors using our products:

Service Provider	Enterprises	Government
● Digicel	● Anadarko	● United States Federal Agencies
● Airtel	● Chevron	● City of Irving
● Eolo	● Duke Energy	● City of Calgary
● 360 Communications	● CSX	● San Antonio Water

Historically, over 95% of our revenues are derived from sales through our ConnectedPartner channel partner platform, which consists of over 6,800 channel partners, including over 160 distributors as of December 31, 2019. In 2017, revenues from three of our distributors, Winncom Technologies, Aikom Technology and WAV, represented 15.3%, 15.2% and 11.2% of our revenues, respectively. In 2018, revenues from Winncom Technologies and Aikom Technology represented 16.1% and 12.0% of our revenues, respectively. In 2019, revenue from Winncom Technologies and Aikom Technology represented 16.0% and 10.9% of our revenues, respectively. We had no other network operator or distributor that accounted for 10% or more of our revenues for the years ended December 31, 2017, 2018 or 2019.

Through our channel sales network, we sell to our global network of distributors who in turn either sell directly to network operators or supply our products to value added resellers. These channel partners provide lead generation, pre-sales support and product fulfillment. Playing a central role in the channel, distributors support us by promoting and distributing our products in target vertical markets, providing value-added support to the reseller channel by bringing core strengths in technical support and professional services, all in addition to financing, logistics, and sales and marketing support. Our distributors typically stock and manage inventory of our products.

Our ConnectedPartner platform is designed to maximize global coverage while minimizing channel conflict and enhance the ability of our channel partners to succeed in the sale and deployment of our products and solutions. Channel partners registered under our ConnectedPartner program gain access to product discounts, sales and marketing tools, marketing materials, specifications sheets, case studies and solution papers to aid in the sale and deployment of our products and solutions globally. We also offer access through our ConnectedPartner platform to technical product training, deal registration, account management support, business development support, webinars and events, promotions and joint marketing initiatives, and qualified lead information as well as participation in our demonstration equipment programs.

Sales and marketing

We promote the sale of our products globally in partnership with our channel partners as well as through our direct sales force. Our sales organization typically engages directly with large Internet service providers and certain enterprises even though product fulfillment generally involves our channel partners, and also provide sales support to our channel partners across the platform. Our sales organization includes field and inside sales personnel, as well as regional technical managers with deep technical expertise who are responsible for pre-sales technical support and solutions engineering for network operators, systems integrators and channel partners. As of December 31, 2019, we had 124 sales personnel operating in over 25 countries.

Our marketing activities consist primarily of technology conferences, web marketing, trade shows, seminars, webinars and events, public training classes, public relations, analyst relations, demand generation and direct marketing to build our brand, increase customer awareness, communicate our product advantages and generate qualified leads for our field sales force and channel partners.

Support and service

Customer support

We support our enterprise class solutions with a range of flexible service plans and 24/7 availability that provide assurance to network operators that their always-on, mission critical communications requirements will be met. We employ a team of support engineers and other support personnel to provide customer service and technical support for our products. Our support organization both supports channel partners in supporting their direct customers and provides first-line support to our direct customers. We offer multiple service options that allow network operators to select the service level that best meets their needs. Our team of support engineers and services personnel provides 24/7 technical support and customer service globally to our network operators. Technical support is also available on-line via chat and automated ticketing systems.

Training

We work closely with our channel partners and network operators to provide comprehensive product training so that they are familiar with the implementation and usage of our products. The training and certification system is administered through a learning management system that provides the user a record of their course work, exam results, current certifications and access to on demand self-directed training resources that complement instructor-led sessions scheduled frequently around the world. In 2017, we also launched Cambium College, a free education program where senior members of our design and development teams share their experience to familiarize people with the math and physics concepts involved in designing and operating a wireless broadband or Wi-Fi network.

Cambium Community Forum

To complement our customer support and training, we launched the Cambium Community Forum in 2014 as a platform where we, our network operators and our channel partners can collaborate in real-time on practical solutions to real-world deployment situations, contribute to and consult a collective online knowledge base concerning our products and best practices, and share stories and photographs of customer experiences about product installations and unique use cases of our technology. In 2019, we added discussion forums focusing on Citizens Broadband Radio Service (CBRS), Video Surveillance, and Wi-Fi 6. Our Community Forum is moderated by our staff with direct and active engagement by our development engineering and product management personnel. Leveraging the Community Forum, we collect network operator and channel partner feedback on potential product improvements and new product ideas, including through the administration of beta testing on our products. As of December 31, 2019, there were approximately 30,000 registered forum members on our Community Forum, including our WISP Forum.

Manufacturing and supply

We outsource the manufacturing of our products to conserve working capital, reduce our manufacturing overhead and inventory, optimize delivery lead times while maintaining high product quality and scale quickly to handle increased order volume. For certain products, we outsource both the design and manufacture of the product and distribute the product under our name on a white label basis. We require all of our primary contract manufacturers to be ISO-9001 certified.

Our contract manufacturing partners generally procure the components needed to build and assemble our products according to our design specifications. This allows us to leverage the purchasing power of our contract manufacturing partners. For items that we design, we generally retain complete control over the bill of material, test procedures and quality assurance programs. We review, on an ongoing basis, forecasts, inventory levels, processes, capacity, yields and overall quality. Our contract manufacturers procure components and assemble our products based on our demand forecasts. These forecasts represent our estimates of future demand for our products based on historical trends and analyses from our sales and product management functions as adjusted for overall market conditions. Generally, for our primary contract manufacturers, we update these forecasts monthly.

Once the completed products are manufactured and tested, configured, inspected and pass quality control inspection, our contract manufacturers ship the products to our direct fulfillment facilities in Kentucky, the Netherlands and Shanghai for shipment to our distributor partners and network operators. We outsource the warehousing and delivery of our products at these fulfillment facilities to a third-party logistics provider for worldwide fulfillment. Our products are installed by network operators or by third-party service providers such as system integrators or value-added resellers on behalf of the customer.

While components and supplies are generally available from a variety of sources, we and our contract manufacturers currently depend on a single or limited number of suppliers for several components for our products. For example, the majority of our products are dependent upon the incorporation of components from Qualcomm Atheros and we do not have a second source for these components. In addition, we currently have a limited number of suppliers for several other components for our products. We and our contract manufacturers generally rely on purchase orders rather than long-term contracts with these suppliers, although for certain components our contract suppliers have contracts in place with component suppliers that we are able to leverage. If we need to seek a suitable second source for key components or to modify our designs to use substitute components, our ability to meet the demand for our products, and as a result our business and operating results, could suffer.

Some of our outsourced contract manufacturers are located in China, and one of our primary distribution centers for the sale and distribution of some of our products is a third-party logistics provider in China. As a result, our business could be adversely impacted by the effects of the recent outbreak of respiratory illness caused by a novel coronavirus (COVID-19) first identified in Wuhan, China. In an effort to halt the outbreak of COVID-19, the Chinese government placed significant restrictions on travel within China, leading to extended business closures. Our suppliers and manufacturers in China could continue to be disrupted by worker absenteeism, quarantines, office and factory closures, disruptions to ports and other shipping infrastructure, or other travel or health-related restrictions and such restrictions could spread to other locations where we outsource the manufacture or distribution of our products if the virus spreads. If our supply chain operations continue to be affected or are curtailed by the outbreak of diseases such as COVID-19, our supply chain, manufacturing and product shipments will be delayed, which could adversely affect our business, operations and customer relationships. We may need to seek alternate sources of supply which may be more expensive, unavailable or may result in delays in shipments to us and from our supply chain and subsequently to our customers. See “Risk Factors, *We face risks related to actual or threatened health epidemics and other outbreaks, which could significantly disrupt our manufacturing, sales and other operations”* below.

Research and development

As of December 31, 2019, our research and development organization has over 280 employees located primarily in San Jose and Thousand Oaks, California, Rolling Meadows, Illinois, Ashburton, United Kingdom and Bangalore, India. We also work with contract engineers in various locations globally. Our research and development team have deep expertise and experience in wireless technology, antenna design and network architecture and operation. We expect to continue to expand our product offerings and solutions capabilities in the future and to invest significantly in continued research and development efforts. Our research and development expenses were $32.2 million, $38.9 million, and $47.7 million in 2017, 2018 and 2019, respectively.

Intellectual property

Our success depends in part on our ability to protect our core technology and innovations. We rely on federal, state, common law and international rights, as well as contractual restrictions, to protect our intellectual property. We control access to our proprietary technology by entering into confidentiality and invention assignment agreements with our employees and contractors, and confidentiality agreements with third parties, such as Internet service providers, vendors, individuals and entities that may be exploring a business relationship with us. In addition to these contractual arrangements, we also rely on a combination of trade secrets, copyrights, patents, trademarks, service marks and domain names to protect our intellectual property. We seek patent protection for certain of our key innovations, protocols, processes and other inventions. We pursue the registration of our trademarks, service marks and domain names in the United States and England and in certain other locations outside of these jurisdictions. These laws, procedures and restrictions provide only limited protection and the legal standards relating to the validity, enforceability and scope of protection of intellectual property rights are uncertain and still evolving. Furthermore, effective patent, trademark, copyright and trade secret protection may not be available in every country in which our products are available.

As of December 31, 2019, we had 35 issued U.S. patents and 72 patents issued in various foreign jurisdictions as well as 10 U.S. and 51 foreign patent applications pending. We file patent applications in the United States and other countries where we believe there to be a strategic technological or business reason to do so. Although we actively attempt to utilize patents to protect our technologies, we believe that none of our patents, individually, are material to our business.

Competition

The market for wireless broadband solutions is rapidly evolving, highly competitive and subject to rapid technological change. We expect competition to persist, intensify and increase in the future.

In all of our markets, we compete with a number of wireless equipment providers worldwide that vary in size and in the products and solutions offered. Our competitors for products and solutions for the unlicensed, sub-6 GHz spectrum bands include Radwin, MicroTik and Ubiquiti. In the licensed microwave market, our competitors include SIAE, SAF Technica and Aviat. Our Wi-Fi products and solutions compete with HPE (Aruba), CommScope (Ruckus Wireless), Extreme Networks, and Ubiquiti. Our cnReach IIoT products and solutions compete with GE MDS and Freewave. As our target markets continue to develop and expand, and as the technology for wireless broadband continues to evolve, we expect competition to increase and expand from both established and emerging market participants. We also expect consolidation to impact the competitive landscape, such as the acquisition by Arris Group of Ruckus Wireless in 2017, and the subsequent acquisition of Arris Group by CommScope in 2019, as well as the acquisition of Aerohive by Extreme Networks in 2019.

The market for our products and solutions is influenced by a variety of factors, including the following:

- Total cost of ownership and return on investment associated with the solutions;
- Ease of configuration, installation and use of the solution;
- Ability to provide a complete compatible solution;
- Broad application across a range of use cases and frequencies;
- Product quality, functionality and reliability;
- Ability to allow centralized management of the solutions to enable better network planning, including scalable provisioning, configuration, monitoring and complete network visualization; and
- Ability to provide quality, full service pre- and post-sales product support.

We believe we compete favorably on each of these factors.

Regulatory requirements

In addition to regulations of general application to global businesses, we are subject to a number of regulatory requirements specific to our industry, including, without limitation:

- Radio frequency usage. Because our products transmit energy in radio frequency spectrum, our products are subject to:
  - rules relating to radio frequency spectrum allocation and authorization of certain radio equipment issued by the Federal Communications Commission for non-federal uses or the National Telecommunications and Information Administration for federal uses; and
  - local type approval, or homologation, rules requiring confirmation that our products meet minimum regulatory, technical and safety requirements prior to sale in various countries around the world, for example: European Technical Standards Institute (ETSI), Industry Canada (IC) and Agencia National De Telecommunicatoes (Anatel).

The applicable regulatory agencies in each jurisdiction adopt regulations to manage spectrum use, establish and enforce priorities among competing uses, limit harmful radio frequency interference and promote policy goals such as broadband deployment. These spectrum regulations regulate allocation, licensing, and equipment authorizations. Since our customers purchase devices to operate in specific spectrum bands allocated by the regulatory authorities, our products must meet the technical requirements set forth for such spectrum allocation(s).

In some bands, the operator, such as our customer, must seek prior regulatory authority to operate using specified frequencies, and the resulting spectrum license authorizes the licensee, for a limited term, to operate in a spectrum consistent with licensed technical parameters within a specified geographic area. We must design and manufacture our products to comply with these technical parameters.

Our products generally are subject to compliance testing prior to approval, and, as a condition of authority in each jurisdiction, we must ensure that our products have the proper labels and documentation specifying such authority. We generally use telecommunications certification bodies to obtain certification for our devices in each jurisdiction in which we intend to market and sell our products.

- Trade compliance requirements. We are subject to compliance with rules in jurisdictions from which we export or into which we import our products, including export control and reporting, import clearance, anti-bribery, antitrust and competition rules and regulations, including:
    - Import and export requirements issued by the United States, the European Union or other jurisdictions, including the U.S. Department of Commerce, the Office of Foreign Assets Control, the U.K. Foreign & Commonwealth Office, Department for International Development, Ministry of Defense and Department of International Trade including rules banning sales to persons or entities on applicable designated parties lists, or to persons or entities in embargoed countries, rules requiring export licenses prior to sales of products incorporating encryption technology to certain end users, and local rules governing import of products, including packaging and labeling laws. In addition, some of our products include enabled encryption technology, which may require us to obtain a license prior to a sale to certain foreign agencies. These rules require us to monitor databases of, and establish and enforce policies to prohibit the sale of our products to, embargoed persons, entities and countries.
    - Rules and regulations, particularly in the United States and the European Union, governing environmental matters that restrict the use of certain dangerous substances in electrical or electronic equipment, govern use of certain chemical substances throughout their lifecycle and Waste Electrical and Electronic Equipment, Directive 2012/2019/EU, related to the collection, treatment, recycling and recovery of waste electrical and electronic equipment in the European Union and related laws elsewhere. These rules govern our use of components in our products, requiring us to comply with environmental rules and regulations in our selection of component parts and in the manufacturing process, as well as over the disposal upon destruction or retirement of our products.

We are also subject to rules governing our use of personal data, such as the General Data Protection Regulation in the European Union, the California Consumer Privacy Act, and other applicable regulations in the United States and around the world, and current and proposed e-privacy and direct marketing rules governing direct and email marketing. These rules govern how we use personal data of our employees, customers and others with whom we might do business, including in our marketing activities.

Employees

We are focused on hiring, training, and retaining exceptional talent. As of December 31, 2019, we had approximately 533 full-time employees, of whom 306 are located outside the United States. We have not experienced any work stoppages, and we consider our relationship with our employees to be good.

Available information

Our Internet address is www.cambiumnetworks.com and our investor relations website is located at http://investors.cambiumnetworks.com. We make available free of charge on our investor relations website under the heading “Financials” our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports as soon as reasonably practicable after such materials are electronically filed with (or furnished to) the SEC. Information contained on our websites is not incorporated by reference into this Annual Report on Form 10-K. In addition, the public may read and copy materials we file with the SEC at the SEC’s Public Reference Room at 100 F Street, NE, Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an Internet site, www.sec.gov, that includes filings of and information about issuers that file electronically with the SEC.

Item 1A. Risk Factors.

This Report contains forward-looking statements that are subject to risks and uncertainties that could cause actual results to differ materially from those projected. These risks and uncertainties include, but are not limited to, the risk factors set forth below. These risk and uncertainties are not the only ones we face. Our business, financial condition, results of operations or prospects could also be harmed by risks and uncertainties not currently known to us or that we currently do not believe are material. If any of the risks actually occur, our business, financial condition, results of operations and prospects could be adversely affected.

Risks related to our business

Our operating results can be difficult to predict and may fluctuate significantly, which could result in a failure to meet investor expectations or our guidance and a decline in the trading price of our shares.

Our quarterly and annual operating results have fluctuated in the past and may fluctuate significantly in the future. In particular, the timing and size of our sales of our products are difficult to predict and can result in significant fluctuations in our revenues from period to period. For instance, we have historically received and fulfilled a substantial portion of sales orders and generated a substantial portion of revenues during the last few weeks of each quarter. In addition, we generally recognize all product revenues in the same period in which the related products are sold. Because our operating results are relatively fixed in the short term, any failure to meet expectations regarding sales could have an immediate and material effect on our earnings. If our revenues or operating results fall below the expectations of investors or securities analysts or below any estimates we may provide to the market, the trading price of our shares would likely decline, which could have a material and adverse impact on investor confidence and employee retention.

Our operating results may fluctuate due to a variety of factors, many of which are outside of our control, and which we may not foresee. In addition to other risks listed in this “Risks Factors” section, factors that may affect our operating results include:

- Fluctuations in demand for our products, including seasonal variations;
- Our failure to timely fulfill orders for our products, which may be due to inability of our third-party manufacturers and suppliers to meet our demand, logistical failures in warehousing and shipping products or other factors;
- Failure of our distributors and channel partners to effectively promote and sell our products or manage their inventory and fulfillment;
- Our ability to control costs, including our manufacturing and component costs and operating expenses;
- Our ability to develop, introduce and ship in a timely manner new products and product enhancements, and to anticipate future market demands;
- Changes in the competitive dynamics of our target markets, including new entrants, consolidation and pricing pressures;
- The inherent complexity, length and associated unpredictability of the sales cycles for our products;
- Announcements made by us or our competitors of new or enhanced products, promotions or other transactions;
- Variation in product costs, prices or mix of products we sell;
- Product quality issues that could result in increases in product warranty costs and harm to our reputation and brand;
- General economic or political conditions in our markets; and
- Increasing uncertainty of international trade relations and tariffs.

The effects of these or other factors individually or in combination could result in fluctuations and unpredictability in our operating results, our ability to forecast those results and the trading price of our shares. As a result, our past results should not be relied upon as an indication of our future performance.

The introduction of new products and technology is key to our success, and if we fail to predict and respond to emerging technological trends and network operators’ changing needs, we may be unable to remain competitive.

The wireless broadband market is generally characterized by rapidly changing technology, changing needs of network operators, evolving regulations and industry standards and frequent introductions of new products and services. Historically, new product introductions have been a key driver of our revenue growth. To succeed, we must effectively anticipate and adapt in a timely manner to network operator requirements and continue to develop or acquire new products and features that meet market demands, technology trends and evolving regulatory requirements and industry standards. Our ability to keep pace with technological developments, such as 5G and LTE, satisfy increasing network operator requirements, and achieve product acceptance depends upon our ability to enhance our current products and develop and introduce or otherwise acquire the rights to new products on a timely basis and at competitive prices. The process of developing new technology is complex and uncertain, and the development of new products and enhancements typically requires significant upfront investment, which may not result in material improvements to existing products or result in marketable new products or cost savings or revenues for an extended period of time, if at all. We are currently investing in the development of products and technology for the 5G standard once it is generally adopted in our target markets. There can be no assurance we will successfully address the new standard in a timely manner or that our products will achieve market acceptance. Network operators have delayed, and may in the future delay, purchases of our products while awaiting release of new products or product enhancements. In addition, the introduction of new or enhanced products requires that we carefully manage the transition from older products to minimize disruption in channel partner ordering practices. If we fail to anticipate industry trends and evolving regulations by developing or acquiring rights to new products or product enhancements and timely and effectively introducing such new products and enhancements, or network operators do not perceive our products to have compelling technological advantages, our business would be adversely affected.

Competitive pressures may harm our business, revenues, growth rates and market share.

We generate a majority of our revenues from sales to wireless internet service providers. The market for wireless broadband products is rapidly evolving, highly competitive and subject to rapid technological change. We expect competition to persist, intensify and increase.

In all our markets, we compete with a number of wireless equipment providers worldwide that vary in size and in the products and solutions offered. Our competitors for products and solutions for the unlicensed, sub-6 GHz spectrum bands include Ubiquiti, Radwin, MikroTik and Telrad. In the licensed microwave markets, our competitors include SIAE, SAF Tehnica and Aviat. Our Wi-Fi products and solutions compete with CommScope (Ruckus Wireless), Cisco Meraki, HPE (Aruba) and Ubiquiti. Our cnReach IIoT products and solutions compete with GE MDS and Freewave. Our cnMatrix cloud-managed switch platform competes with Ubiquiti, Ruckus, HPE and MikroTik. Our cnMatrix Ethernet enterprise switching products and solutions compete with MikroTik, Ubiquiti, and HPE. As our target markets continue to develop and expand, and as the technology for wireless broadband continues to evolve, we expect competition to increase. We also expect consolidation to impact the competitive landscape, such as the acquisition by Arris Group of Ruckus Wireless in 2017, and the subsequent acquisition of Arris Group by CommScope in 2019, as well as the acquisition of Aerohive by Extreme Networks in 2019.

Demand for our solutions versus those of our competitors is influenced by a variety of factors, including the following:

- Product quality, performance, features and functionality, and reliability;
- Depth and breadth of the sales channel;
- Brand awareness and reputation;
- Total cost of ownership and return on investment associated with the products;
- Ease of configuration, installation and use of the products;
- Ability to provide a complete compatible and scalable solution;
- Broad application across a range of use cases;
- Ability to allow centralized management of the products and network to better enable network planning, including scalable provisioning, configuration, monitoring and complete network visualization; and
- Strength, quality and scale of pre- and post-sales product support.

We expect increased competition from our current competitors, as well as emerging companies and established companies, such as Nokia, Ericsson, Huawei and NEC, that may enter our markets. Further, we have in the past and may again experience price competition from lower cost vendors selling to network operators that have lower budget or less demanding applications than our products have been designed to serve. To address these competitive conditions, we introduced our lower cost ePMP and PTP 550 products that allow us to target certain market segments without compromising our gross margins on our more sophisticated and functionally versatile products. We also expect that even higher cost competitors may engage in price competition to establish greater market share, which may adversely affect our ability to grow our revenues and profitability. Competition could result in loss of market share, increased pricing pressure, reduced profit margins, or increased sales and marketing expense, any of which would likely cause serious harm to our business, operating results or financial condition.

A number of our current or potential competitors have longer operating histories, greater name recognition, significantly larger customer bases and sales channels and significantly greater financial, technical, sales, marketing and other resources than we do. Our competitors may be able to anticipate, influence or adapt more quickly to new or emerging technologies and changes in network operator requirements, devote greater resources to the promotion and sale of their products and services, initiate or withstand substantial price competition, bundle similar products to compete, take advantage of acquisitions or other opportunities more readily, and develop and expand their product and service offerings more quickly than we can.

Some of our competitors have been acquired or entered into partnerships or other strategic relationships to offer a more comprehensive solution than they had previously offered. We expect this trend to continue. The companies resulting from such consolidation may create more compelling products and be able to offer greater pricing flexibility, making it more difficult for us to compete effectively. In addition, continued industry consolidation might adversely affect network operators' perceptions of the viability of smaller and even medium-sized wireless broadband equipment providers and, consequently, network operators' willingness to purchase from those companies.

Additionally, the markets for development, distribution and sale of our products are rapidly evolving. New entrants seeking to gain market share by introducing new technology and new products may make it more difficult for us to sell our products, and could create increased pricing pressure, reduced profit margins due to increased expenditure on sales and marketing, or the loss of market share or expected market share, any of which may significantly harm our business, operating results and financial condition. The success of new products depends on several factors, including appropriate new product definition, component costs, timely completion and introduction of products, differentiation of new products from those of our competitors and market acceptance of these products. We may not be able to successfully anticipate or adapt to changing technology on a timely basis, or at all. New technologies could render our existing products less attractive and if such technologies are widely adopted as the industry standard for wireless Internet service providers, our business financial condition, results of operations and prospects could be materially adversely affected.

We rely on third-party manufacturers, which subjects us to risks of product delivery delays and reduced control over product costs and quality.

We outsource the manufacturing of our products to third-party manufacturers such as Flextronics, with whom we entered into an agreement pursuant to which Flextronics manufactures and supplies certain of our products subject to orders from us and our demand forecasts. In certain cases, we rely on third-party manufacturers to design products to our specifications and license those designs back to us. Purchases from these third-party manufacturers account for the most significant portion of our cost of revenues. Our reliance on third-party manufacturers reduces our control over the manufacturing process, including reduced control over quality, product costs and product supply and timing. From time to time, we have experienced and may in the future experience delays in shipments or issues concerning product quality from our third-party manufacturers. For example, in the third quarter of 2018, we experienced a delay in expected bookings for new products that in turn led us to delay procurement of finished goods from our contract manufacturers. The delay resulted in our inability to fulfill orders placed late in the quarter and a delay in recognition for these sales until the fourth quarter of 2018. If any of our third-party manufacturers suffer interruptions, delays or disruptions in supplying our products, including by natural disasters or work stoppages or capacity constraints, our ability to ship products to distributors and network operators would be delayed. Additionally, if any of our third-party manufacturers experience quality control problems in their manufacturing operations and our products do not meet network operators' requirements, we could be required to cover the repair or replacement of any defective products. These delays or product quality issues could have an immediate and material adverse effect on our ability to fulfill orders and could have a negative impact on our operating results. In addition, such delays or issues with product quality could harm our reputation and our relationship with our channel partners.

Our agreements do not typically obligate our third-party manufacturers to supply products to us in specific quantities or for an extended term, which could result in short notice to us of supply shortages and increases in the prices we are charged for manufacturing services. We believe that our orders may not represent a material portion of the total orders of our primary third-party manufacturers, such as Flextronics, and, as a result, fulfilling our orders may not be prioritized in the event they are constrained in their abilities or resources to fulfill all of their customer obligations in a timely manner. Although we provide demand forecasts to some of our third-party manufacturers, such forecasts are not generally binding and if we overestimate our requirements, some of our third-party manufacturers may assess charges, or we may have liabilities for excess inventory, each of which could negatively affect our gross margins. Conversely, because lead times for required materials and components vary significantly and depend on factors such as the specific supplier, contract terms and the demand for each component at a given time, if we underestimate our requirements, our third-party manufacturer may have inadequate materials and components required to produce our products. This could result in an interruption of the manufacturing of our products, delays in shipments and deferral or loss of revenues.

If our third-party manufacturers experience financial, operational, manufacturing capacity or other difficulties, or experience shortages in required components, or if they are otherwise unable or unwilling to continue to manufacture our products in required volumes or at all, our supply may be disrupted, we may be required to seek alternate manufacturers and we may be required to re-design our products. It would be time-consuming and costly, and could be impracticable, to begin to use new manufacturers and designs and such changes could cause significant interruptions in supply and could have an adverse impact on our ability to meet our scheduled product deliveries and may subsequently lead to the loss of sales, delayed revenues or an increase in our costs, which could materially and adversely affect our business and operating results.

We rely on distributors and value-added resellers for the substantial majority of our sales, and the failure of our channel partners to promote and support sales of our products would materially reduce our expected future revenues.

We rely on channel partners for a substantial majority of our sales and our future success is highly dependent upon establishing and maintaining successful relationships with distributors and value-added resellers. Recruiting and retaining qualified channel partners and training them in our technology and products require significant time and resources. Our reliance on channel partners for sales of our products results in limited visibility into demand and channel inventory levels which in turn adversely impacts our ability to accurately forecast our future revenues. By relying on our channel partners, we may have less contact with network operators, thereby making it more difficult for us to establish brand awareness, service ongoing network operator requirements and respond to evolving needs for new product functionality.

Sales through distributors have been highly concentrated in a few distributors, with over 40%, 37%, and 36% of our revenues in 2017, 2018 and 2019, respectively, coming from our three largest distributors. In addition, certain of our distributors may rely disproportionately on sales to a small number of end customers. For example, purchases from Aikom Technology by an end customer accounted for 12% of our revenues in 2017 and 8.7% in both 2018 and 2019. Termination or degradation of a relationship with a major distributor, or of a distributor with its major customer, could result in a temporary or permanent material loss of revenues. We may not be successful in finding other distributors on satisfactory terms, or at all, and our distributors may fail to maintain or replace business with their major customer, either of which could adversely affect our ability to sell in certain geographic markets or to certain network operators, adversely impacting our revenues, cash flow and market share.

We generally do not require minimum purchase commitments from our channel partners, and our agreements do not prohibit our channel partners from offering products or services that compete with ours or from terminating our contract on short notice. Many of our channel partners also sell products from our competitors. Some of our competitors may have stronger relationships with our channel partners than we do and we have limited control, if any, over the sale by our channel partners of our products instead of our competitors' products, or over the extent of the resources devoted to market and support our competitors' products, rather than our products or solutions. Our competitors may be more effective in providing incentives to existing and potential channel partners to favor their products or to prevent or reduce sales of our products. Our failure to establish and maintain successful relationships with our channel partners would materially and adversely affect our business, operating results and financial condition.

We face risks related to actual or threatened health epidemics and other outbreaks, which could significantly disrupt our manufacturing, sales and other operations.

Our business could be adversely impacted by the effects of a widespread outbreak of contagious disease, including the recent outbreak of respiratory illness caused by a novel coronavirus (COVID-19). The impacts of the global emergence of COVID-19 on our business and financial results are currently unknown. We are conducting business with substantial modifications to employee travel, employee work locations, and virtualization or cancellation of certain sales and marketing events, among other modifications. Our business is highly dependent on travel of our sales, operations, quality and technical support, and other managers and employees. Limitations placed on travel, both to China and other regions in Asia, Europe or elsewhere could significantly limit our ability to market our products, establish relationships with new customers, and manage post-contract support and maintenance activities. Other companies as well as many governments are taking precautionary and preemptive actions to address COVID-19, and they may take further actions that cause us or our customers or suppliers to alter their normal business operations. We will continue to actively monitor the situation and may take further actions that alter our business operations as may be required by federal, state or local authorities, or that we determine are in the best interest of our employees, customers, partners, suppliers and shareholders. It is not clear what the potential effects any such alterations or modifications may have on our business, including the effects on our customers and prospects, or on our financial results.

In addition, we have third-party outsourced contract manufacturers in China for the manufacture of some of our products, and one of our primary distribution centers for the sale and distribution of some of our products is a third-party logistics provider in China. Previously, in an effort to halt the outbreak of COVID-19, the Chinese government placed significant restrictions on travel within China, leading to extended business closures. Although many of the restrictions on operations of our subcontractors have been eased, our suppliers and manufacturers in China could continue to be disrupted by worker absenteeism, quarantines, office and factory closures, disruptions to ports and other shipping infrastructure, or other travel or health-related restrictions and such restrictions could spread to other locations where we outsource manufacture or distribution of our products if the virus continues to spread. If our supply chain operations are affected or are curtailed by the outbreak of diseases such as COVID-19, our supply chain, manufacturing and product shipments will be delayed, which could adversely affect our business, operations and customer relationships. We may need to seek alternate sources of supply which may be more expensive, unavailable or may result in delays in shipments to us from our supply chain and subsequently to our customers. Further, if our distributors' or end user customers' businesses are similarly affected, they might delay or reduce purchases from us, which could adversely affect our results of operations. We may suffer delays introducing new products to the market as a result of parts unavailability or shortage, resulting in loss or delay of revenue.

The macroeconomic effects of the coronavirus outbreak could adversely affect the economies and financial markets of many countries, resulting in an economic downturn that could affect demand for our products and likely impact our operating results. Although the impact of the coronavirus outbreak on our business and operations remains uncertain and will depend on developments such as the impact on our customers, vendors, distributors and resellers, the continued spread of the coronavirus or the occurrence of other epidemics or pandemics and the imposition of related public health measures and travel restrictions may adversely impact our business, financial condition, operating results and cash flows.

Our revenue growth rate in recent periods may not be indicative of our future performance.

Our revenue growth rate in recent periods may not be indicative of our future performance. For example, our revenues grew 19.4% from 2016 to 2017, 11.6% from 2017 to 2018, but only 10.4% from 2018 to 2019. Accordingly, we may not achieve similar revenue growth rates of our earlier years in future periods. Our revenues for any prior annual period may not be an indication of our future revenues or revenue growth. If we are unable to maintain consistent revenues or revenue growth, our operating results and the trading price of our shares could be materially affected.

Our third-party logistics and warehousing provider may fail to deliver products to our channel partners and network operators in a timely manner, which could harm our reputation and operating results.

We rely on our third-party logistics and warehousing provider, with distribution hubs in the United States, the Netherlands and China, to fulfill the majority of our worldwide sales and deliver our products on a timely basis. Any delay in delivery of our products to distributors or network operators could create dissatisfaction, harm our reputation, result in the loss of future sales and, in some cases, subject us to penalties. We rely on our third-party logistics and warehousing provider to accurately segregate and record our inventory for us and to report to us the receipt and shipments of our products. Our third-party logistics and warehousing provider also manages and tracks the delivery of our products from the warehouse and safeguards our inventory, which accounts for a vast majority of our inventory balance. The failure of our third-party logistics and warehousing provider to perform these key tasks sufficiently could disrupt the shipment of our products to distributors and network operators or cause errors in our recorded inventory, either of which could adversely affect our business and operating results.

Our ability to sell our products is highly dependent on the quality of our support and services offerings, and our failure to offer high-quality support and services could have a material adverse effect on our business, operating results and financial condition.

Network operators rely on our products for critical applications and, as such, high-quality support is critical for the successful marketing and sale of our products. If we or our channel partners do not provide adequate support to network operators in deploying our products or in resolving post-deployment issues quickly, our reputation may be harmed and our ability to sell our products could be materially and adversely affected.

If we or our distributors and channel partners are unable to attract new network operators or sell additional products to network operators that currently use our products, our revenue growth would be adversely affected, and our revenues could decrease.

To increase our revenues, we depend on the adoption of our solutions by network operators that purchase our products through our channel partners. Network operators typically need to make substantial investments when deploying network infrastructure, which can delay a purchasing decision. Once a network operator has deployed infrastructure for a particular portion of its network, it is often difficult and costly to switch to another vendor's equipment. Although our ePMP Elevate product enables network operators to use Cambium ePMP equipment to leverage an installed base of CPE provided by certain other vendors, if we or our channel partners are unable to demonstrate that our products offer significant performance, functionality or cost advantages to the competitor's product, it would be difficult for us to generate sales to that network operator once a competitor's equipment has been deployed.

Our future success also depends significantly on additional purchases of our products by network operators that have previously purchased our products. Network operators may choose not to purchase additional products because of several factors, including dissatisfaction with our products or pricing relative to competitive offerings, reductions in network operators' spending levels or other causes outside of our control. If we are not able to generate repeat purchases from network operators, our revenues may grow more slowly than expected or may decline, and our business and operating results would be adversely affected.

The seasonality of our business creates significant variance in our quarterly revenues, which makes it difficult to compare or forecast our financial results on a quarter-by-quarter basis.

Our revenues fluctuate on a seasonal basis, which affects the comparability of our results between sequential periods. While generally consistent, in certain periods other business factors have masked this seasonal pattern and the quantifiable effects of these seasonal variations are difficult to predict accurately. For example, in the second quarter of 2019 we achieved record sales level in part driven by sales to a large customer in Europe, Middle East, Africa region, but we also experienced declines in our Asia Pacific region due to delayed spending in the government sector. These factors introduce risk into our business as we rely upon forecasts of demand to build inventory in advance of anticipated sales. If our sales mix changes, or if the geographic mix of our sales changes, the seasonal nature of our revenues may change in unpredictable ways, which could increase the volatility of both our financial results and share price.

We require third-party components, including components from limited or sole source suppliers, to build our products. The unavailability of these components could substantially disrupt our ability to manufacture our products and fulfill sales orders.

We rely on third-party components to build our products, and we rely on our third-party manufacturers to obtain the components necessary for the manufacture of our products. If we underestimate our requirements or our third-party suppliers are not able to timely deliver components, our third-party manufacturers may have inadequate materials and components required to produce our products. This could result in an interruption in the manufacture of our products, delays in shipments and deferral or loss of revenues.

We have in the past and may in the future experience shortages in available supply of required components. Unpredictable price increases for such components may also occur. We and our third-party manufacturers generally rely on purchase orders rather than long-term contracts with suppliers of required components. As a result, our third-party manufacturers may not be able to secure sufficient components at reasonable prices or of acceptable quality to build our products in a timely manner, adversely impacting our ability to meet demand for our products. In addition, if our component suppliers cease manufacturing needed components, we could be required to redesign our products to incorporate components from alternative sources or designs, a process which would cause significant delays in the manufacture and delivery of our products.

We currently depend on a limited number of suppliers for several critical components for our products, including chipsets from Qualcomm Atheros. In some instances, we use sole or single source suppliers for our components to simplify design and fulfillment logistics. Neither we nor our third-party manufacturers carry substantial inventory of our product components. Many of these components are also widely used in other product types. Shortages are possible and our ability to predict the availability of such components may be limited. In the event of a shortage or supply interruption from our component suppliers, we or our third-party manufacturers may not be able to develop alternate or second sources in a timely manner, on commercially reasonable terms or at all, and the development of alternate sources may be time-consuming, difficult and costly. Any resulting failure or delay in shipping products could result in lost revenues and a material and adverse effect on our operating results.

Our gross margin varies from period to period and may decline in the future.

Our gross margin varies from period to period, may be difficult to predict and may decline in future periods. Variations in our gross margin are generally driven by shifts in the mix of products we sell, the timing and related cost of fulfilling orders and other factors. In addition, the market for wireless broadband solutions is characterized by rapid innovation and declining average sale prices as products mature in the marketplace. The sales prices and associated gross margin for our products may decline due to change in sales strategy, competitive pricing pressures, demand, promotional discounts and seasonal changes in demand. Larger competitors with more diverse product and service offerings may reduce the price of products or services that compete with ours or may bundle them with other products and services. If we meet such price reductions but do not similarly reduce our product manufacturing costs, our margins would decline. Any decline in our gross margins could have an adverse impact on the trading price of our shares.

Our products are technologically complex and may contain undetected hardware defects or software bugs, which could result in increased warranty claims, loss of revenues and harm to our reputation.

Our products are technologically complex and, when deployed, are critical to network operations. Our products rely on our proprietary embedded software, and have in the past contained and may in the future contain undetected errors, bugs or security vulnerabilities, or suffer reliability or quality issues. Some defects in our products may only be discovered after a product has been installed and used by network operators. Any errors, bugs, defects, security vulnerabilities or quality or reliability issues discovered in our products after commercial release could result in increased warranty claims, damage to our reputation and brand, loss of market shares or loss of revenues, any of which could adversely affect our business, operating results and financial condition. In addition, our products operate in part in outdoor settings and must withstand environmental effects such as severe weather, lightning or other damage. Our products may also contain latent defects and errors from time to time related to embedded third-party components.

We have in the past and may in the future become subject to warranty claims that may require us to make significant expenditures to repair or replace defective products, or redesign our products to eliminate product vulnerabilities. We may in the future also be the subject of product liability claims. Such claims could require a significant amount of time and expense to resolve and defend against and could harm our reputation by calling into question the quality of our products. We also may incur costs and expenses relating to a recall of one or more of our products. The process of identifying recalled products that have been widely distributed may be lengthy and require significant resources and we may incur significant replacement costs, contract damage claims from network operators and harm to our reputation. Additionally, defects and errors may cause our products to be vulnerable to security attacks, cause them to fail to help secure networks or temporarily interrupt network traffic. Although we disclaim responsibility for certain warranty and product liability claims as well as product recalls or security problems, any substantial costs or payments made in connection with warranty and product liability claims, product recalls or security problems could cause our operating results to decline and harm our brand.

If our channel partners do not effectively manage inventory of our products, fail to timely resell our products or overestimate expected future demand, they may reduce purchases in future periods, causing our revenues and operating results to fluctuate or decline.

Our channel partners purchase and maintain inventories of our products to meet future demand and have only limited rights to return the products they have purchased from us. Our channel partners are not generally committed to volume purchases of our products in any period. Accordingly, if our channel partners purchase more product than is required to meet demand in a particular period, causing their inventory levels to grow, they may delay or reduce additional future purchases, causing our quarterly results to fluctuate and adversely impacting our ability to accurately predict future earnings.

If we are not able to effectively forecast demand or manage our inventory, we may be required to record write-downs for excess or obsolete inventory.

We maintain inventory of finished goods and, to a lesser extent, raw materials that we believe are sufficient to allow timely fulfillment of sales. Growth in our sales and new product launches may require us to build inventory in the future. Higher levels of inventory expose us to a greater risk of carrying excess or obsolete inventory, which may in turn lead to write-downs. We may also record write-downs in connection with the end-of-life for specific products. For example, in 2019, our inventories increased by $11.1 million due to changes in the demand outlooks across a larger customer in Italy and in the defense sector. Decisions to increase or maintain higher inventory levels are typically based upon uncertain forecasts or other assumptions. Because the markets in which we compete are volatile, competitive and subject to rapid technology and price changes, if the assumptions on which we base these decisions turn out to be incorrect, our financial performance could suffer and we could be required to write-off the value of excess products or components inventory.

We are exposed to the credit risk of our channel partners, which could result in material losses.

We generate a substantial majority of our revenues through sales to our distributors. Distributors may not have the resources required to meet payment obligations, or may delay payments if their end customers are late making payments. Our exposure to credit risks of our channel partners and their end customers may increase if such entities are adversely affected by global or regional economic conditions. Given the broad geographic coverage of our distributor relationships, we have in the past and may in the future experience difficulties surrounding the collection of payments. Any significant delay or default in the collection of significant accounts receivable could result in the need for us to obtain working capital from other sources.

If we do not effectively deploy and train our direct sales force, we may be unable to increase sales.

Although we rely on channel partners to fulfill the substantial majority of our sales, our direct sales force plays a critical role driving our sales through direct engagement with network operators. We have invested and will continue to invest substantially in our sales organization. Our sales headcount has grown from 87 as of December 31, 2016 to 125 as of December 31, 2019, as we focus on growing our business, entering new markets and increasing our market share, and we expect to continue to incur significant expenses as we continue to invest in sales and marketing in order to achieve revenue growth. There is significant competition for sales personnel with the skills and technical knowledge that we require. Our ability to achieve significant revenue growth will depend, in large part, on our success in recruiting, training, retaining and integrating sufficient numbers of sales personnel to support our growth, particularly in international markets. New hires require significant training and may take significant time before they achieve full productivity. Our recent hires may not become productive as quickly as we expect, and we may be unable to hire and retain sufficient numbers of qualified individuals needed to increase our sales. If we are unable to hire and train a sufficient number of effective sales personnel, or the sales personnel we hire do not achieve expected levels of productivity, our business, operating results and financial condition could be materially adversely affected.

Our business and prospects depend on the strength of our brand. Failure to maintain and enhance our brand would harm our ability to increase sales by expanding our network of channel partners as well as the number of network operators who purchase our products.

Maintaining and enhancing our brand is critical to expanding our base of channel partners and the number of network operators who purchase our products. Maintaining and enhancing our brand will depend largely on our ability to continue to develop products and solutions that provide the high quality at attractive economics sought by network operators. If we fail to promote, maintain and protect our brand successfully, our ability to sustain and expand our business and enter new markets will suffer. Our brand may be impaired by a number of factors, including product failure and counterfeiting. If we fail to maintain and enhance our brand, or if we need to incur unanticipated expenses to establish the brand in new markets, our operating results would be negatively affected.

If we are unable to manage our growth and expand our operations successfully, our business and operating results will be harmed.

We have expanded our operations significantly since inception and anticipate that further significant geographic and market expansion will be required to achieve our business objectives. The growth and expansion of our geographic sales, expansion of our products and our entry into new industry verticals places a significant strain on our management, operational and financial resources. Any such future growth would also add complexity to and require effective coordination throughout our organization. To manage any future growth effectively, we must continue to improve and expand our information technology and financial infrastructure, our operating and administrative systems and controls, and our ability to manage headcount, capital and processes in an efficient manner. We may not be able to successfully implement improvements to these systems and processes in a timely or efficient manner, which could result in additional operating inefficiencies and could cause our costs to increase more than planned. If we do increase our operating expenses in anticipation of the growth of our business and this growth does not meet our expectations, our operating results may be negatively impacted. If we are unable to manage future expansion, our ability to provide high quality products and services could be harmed, which could damage our reputation and brand and may have a material adverse effect on our business, operating results and financial condition.

Our sales cycles can be long and unpredictable and our sales efforts require considerable time and expense. As a result, our sales and revenues are difficult to predict and may vary substantially from period to period.

Our sales efforts involve educating channel partners and network operators about the technical capabilities, applications and benefits of our products. Network operators typically require long sales cycles to select a product supplier and place sales orders. The sale process usually begins with an evaluation, followed by one or more network trials, followed by vendor selection and finally installation, testing and deployment. Network operator purchasing activity depends upon the stage of completion of expanding network infrastructures and the availability of funding, among other factors. We spend substantial time and resources on our sales efforts without any assurance that our efforts will produce any sales. In addition, purchases of our products are frequently subject to budget constraints, multiple approvals, and unplanned administrative, processing and other delays. Moreover, the evolving nature of the market may lead prospective network operators to postpone their purchasing decisions pending resolution of network standards or adoption of technology by others. Network operators may also postpone a purchase decision pending the release of new or enhanced products by us or others. As a result, it is difficult to predict whether a sale will be completed, the particular period in which a sale will be completed or the period in which revenues from a sale will be recognized. Our operating results may therefore vary significantly from quarter to quarter.

A portion of our revenues are generated by sales to government entities, which are subject to a number of challenges and risks.

We derive a portion of our revenues from contracts with government agencies and we believe the success and growth of our business will in part depend on our continued and increasing sales to U.S. and foreign, federal, state and local governmental end customers in the future. However, demand from government agencies is often unpredictable, and we may be unable to maintain or grow our revenues from this market. Sales to government agencies are subject to substantial risks, including but not limited to the following:

- selling to government agencies can be highly competitive, expensive and time-consuming, often requiring significant upfront time and expense without any assurance that such efforts will generate a sale;
- government entities may have statutory, contractual or other legal rights to terminate contracts with our channel partners or us for convenience or due to a default, and any such termination may adversely impact our future business, financial condition, results of operations and prospects;
- U.S. or other government certification requirements applicable to our goods and services may be difficult to meet, require an additional administrative or compliance burden on us not found in our commercial contracts, and if we are unable to meet these certification requirements, our ability to sell into the government sector may be adversely impacted until we have attained required certifications;

- government demand and payment for our services may be adversely impacted by public sector budgetary cycles and funding constraints;
- selling to government entities may require us to comply with various regulations that are not applicable to sales to non-government entities, including regulations that may relate to pricing, classified material and other matters, or requirements regarding the development and maintenance of programs such as small business subcontracting, or compliance with EEOC requirements. Complying with such regulations may also require us to put in place controls and procedures to monitor compliance with the applicable regulations that may be costly or not possible;
- the U.S. government may require certain products that it purchases be manufactured in the United States and other relatively high-cost manufacturing locations under Buy American Act or other regulations, and we may not manufacture all products in locations that meet these requirements, which may preclude our ability to sell some products or services; and
- governments may investigate and audit government contractors' administrative and financial processes and compliance with laws and regulations applicable to government contractors, and any unfavorable audit could result in fines, civil or criminal liability, damage to our reputation and suspension or debarment from further government business.

The occurrence of any of the foregoing could cause governments and governmental agencies to delay or refrain from purchasing our products in the future which could materially and adversely affect our operating results.

We generate a significant amount of revenues from sales outside of the United States, and we are therefore subject to a number of risks associated with international sales and operations.

We have extensive international operations and generate a significant amount of revenues from sales to channel partners in Europe, the Middle East and Africa, Asia-Pacific and South America. For example, sales outside of the United States accounted for 58% of our total revenues in 2017, 57% in 2018, and 55% in 2019. We rely on our third-party logistics and warehousing provider, with distribution hubs in the United States, the Netherlands and China, to fulfill the majority of our worldwide sales and to deliver our products to our customers. We have estimated the geographical distribution of our product revenues based on the ship-to destinations specified by our distributors when placing orders with us. Our ability to grow our business and our future success will depend on our ability to continue to expand our global operations and sales worldwide.

As a result of our international reach, we must hire and train experienced personnel to manage our international operations. If we experience difficulties in recruiting, training, managing and retaining an international staff, and specifically staff related to sales management and sales personnel, we may experience difficulties expanding our sales outside of the United States. If we are not able to maintain these relationships internationally or to recruit additional channel partners, our future international sales could be limited. Business practices in the international markets that we serve may differ from those in the United States and may require us in the future to include terms other than our standard terms in contracts. In addition, we face risks to our business based on changes in tariffs, trade barriers, export regulations, political conditions and contractual restrictions. For example, our cost of goods in the Wi-Fi and switch products, as well as most of our ePMP products, has been adversely affected by U.S. tariffs on goods produced for us in China and later imported into the United States. Our products manufactured in China may also be adversely affected by the outbreak of diseases such as the coronavirus, if such diseases result in delays, shutdowns or other restrictions on our manufacturing processes in China, or on our ability to distribute products from our distribution centers in China. We also have products manufactured for us in Mexico, and there is increasing uncertainty of trade relations between Mexico and the United States. Our future operating results could be materially affected to the extent additional tariffs are imposed by the United States or other countries.

Our international sales and operations are subject to a number of risks, including the following:

- fluctuations in currency exchange rates, which could drive fluctuations in our operating expenses;
- required local regulatory certifications in each jurisdiction, which may be delayed for political or other reasons other than product quality or performance;
- requirements or preferences for domestic products, which could reduce demand for our products;
- differing technical standards, existing or future regulatory and certification requirements and required product features and functionality;
- management communication problems related to entering new markets with different languages, cultures and political systems;
- difficulties in enforcing contracts and collecting accounts receivable, and longer payment cycles, especially in emerging markets;

- heightened risks of unfair or corrupt business practices in certain geographies and of improper or fraudulent sales arrangements that may impact financial results and result in restatements of, and irregularities in, financial statements;
- difficulties and costs of staffing and managing foreign operations;
- the uncertainty of protection of intellectual property rights in some countries;
- potentially adverse tax consequences, including regulatory requirements regarding our ability to repatriate profits to the United Kingdom;
- requirements to comply with foreign privacy, information security, and data protection laws and regulations and the risks and costs of non-compliance;
- added legal compliance obligations and complexity;
- the increased cost of terminating employees in some countries;
- political and economic instability and terrorism; and
- the impact of the spread of any diseases globally that might impact our operations.

These and other factors could harm our ability to generate future international revenues. Expanding our existing international operations and entering into additional international markets will require significant management attention and financial commitments. Our failure to successfully manage our international operations and the associated risks effectively could limit our future growth or materially adversely affect our business, operating results and financial condition.

Economic conditions and regulatory changes following the United Kingdom's exit from the European Union could adversely impact our operations, operating results and financial condition.

The United Kingdom ceased to be a member of the European Union on January 31, 2020. The provisions governing the U.K.'s departure from the European Union, Brexit, will be determined during the 11-month period ending December 31, 2020, during which time the UK will continue to follow all of the EU's rules and its trading relationship will remain the same as prior to Brexit. The future effects of Brexit following this transition period will depend on any agreements the United Kingdom makes to retain access to the European Union or other markets either during a transitional period or more permanently. Given the lack of comparable precedent, it is unclear what economic, financial, trade and legal implications the withdrawal of the United Kingdom from the European Union will have generally and how such withdrawal will affect us.

A withdrawal may, among other outcomes, disrupt the free movement of goods, services and people between the United Kingdom and the European Union, undermine bilateral cooperation in key geographic areas, disrupt the markets we serve, and significantly disrupt trade between the United Kingdom and the European Union or other nations as the United Kingdom pursues independent trade relations. Since we derive most of our revenues through our U.K. subsidiary, which owns our intellectual property, the consequences of Brexit, together with the significant uncertainty regarding the provisions governing the relationship between the U.K. and the European Union after December 31, 2020, could adversely change our tax benefits or liabilities in certain jurisdictions and adversely impact our trade operations and our management of our export compliance from our Netherlands distribution hub. Our U.K. operations may be adversely affected as we become subject to new laws and regulations implemented in the U.K. as part of Brexit, including compliance with U.K. labor and other regulations as well as compliance with EU privacy laws. Brexit could also create uncertainty with respect to the legal and regulatory requirements over the operation of our products to which we and our network operators in the U.K. are subject and lead to divergent national laws and regulations as the U.K. government determines which EU laws to replace or replicate.

While we are not experiencing any immediate adverse impact on our financial condition as a direct result of Brexit, the effects of Brexit will depend on any agreements the United Kingdom makes to retain access to the European Union or other markets either during a transitional period or more permanently. Compliance with new laws or regulations regarding trade, delivery and other cross-border activities between the United Kingdom and the European Union could be costly, negatively impacting our business, financial condition, operating results and cash flows.

The loss of key personnel or an inability to attract, retain and motivate qualified personnel may impair our ability to expand our business.

Our success is substantially dependent upon the continued service and performance of our senior management team and key technical, marketing and production personnel. Our employees, including our senior management team, are at-will employees, and therefore may terminate employment with us at any time with no advance notice. The replacement of any members of our senior management team or other key personnel likely would involve significant time and costs and may significantly delay or prevent the achievement of our business objectives.

Our future success also depends, in part, on our ability to continue to attract and retain highly skilled personnel. Competition for highly skilled personnel is frequently intense, particularly for highly skilled research and development personnel. Any failure to successfully attract or retain qualified personnel to fulfill our current or future needs may negatively impact our growth.

If we fail to maintain an effective system of internal controls, our ability to produce timely and accurate financial statements or comply with applicable regulations could be impaired.

As a public company, we are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, and the rules and regulations of Nasdaq. The requirements of these rules and regulations has and will increase our legal, accounting and financial compliance costs, make some activities more difficult, time-consuming and costly and place strain on our personnel, systems and resources.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures over financial reporting. We are continuing to develop and refine our disclosure controls, internal control over financial reporting and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we will file with the SEC is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and that information required to be disclosed in reports under the Exchange Act is accumulated and communicated to our principal executive and financial officers.

Our current controls and any new controls we develop may become inadequate because of growth in our business. Further, weaknesses in our internal controls have been discovered and additional ones may be discovered in the future. Any failure to develop or maintain effective controls, or any difficulties encountered in their implementation or improvement, could harm our operating results or cause us to fail to meet our reporting obligations and may result in a restatement of our financial statements for prior periods. Any failure to implement and maintain effective internal controls also could adversely affect the results of periodic management evaluations and annual independent registered public accounting firm attestation reports regarding the effectiveness of our internal control over financial reporting that we will be required to include in our periodic reports we will file with the SEC under Section 404 of the Sarbanes-Oxley Act once we cease to be an emerging growth company. Ineffective disclosure controls and procedures and internal control over financial reporting could also cause investors to lose confidence in our reported financial and other information, which would likely have a negative effect on the market price of our shares.

We have expended and anticipate we will continue to expend significant resources, and we expect to provide significant management oversight, to maintain and improve the effectiveness of our disclosure controls and procedures and internal controls over financial reporting. Any future failure to maintain the adequacy of our internal controls, or consequent inability to produce accurate financial statements on a timely basis, could increase our operating costs and could materially impair our ability to operate our business. If our internal controls are perceived as inadequate or we are unable to produce timely or accurate financial statements, investors may lose confidence in our operating results and our share price could decline. In addition, if we are unable to continue to meet these requirements, we may not be able to remain listed on Nasdaq.

Our independent registered public accounting firm is not required to formally attest to the effectiveness of our internal control over financial reporting until after we are no longer an emerging growth company. At such time, our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our controls are documented, designed or operating. Any failure to maintain effective disclosure controls and internal control over financial reporting could have a material and adverse effect on our business and operating results and could cause a decline in the price of our shares.

A substantial portion of our product portfolio relies on the availability of unlicensed RF spectrum and if such spectrum were to become unavailable through overuse or licensing, the performance of our products could suffer and our revenues from their sales could decrease.

A substantial portion of our product portfolio operates in unlicensed RF spectrum, which is used by a wide range of consumer devices and is becoming increasingly crowded. If such spectrum usage continues to increase through the proliferation of consumer electronics and products competitive with ours, the resultant higher levels of noise in the bands of operation our products use could decrease the effectiveness of our products, which could adversely affect our ability to sell our products. Our business could be further harmed if currently unlicensed RF spectrum becomes licensed in the United States or elsewhere. Network operators that use our products may be unable to obtain licenses for RF spectrum. Even if the unlicensed spectrum remains unlicensed, existing and new governmental regulations may require we make changes in our products. For example, to provide products for network operators who utilize unlicensed RF spectrum, we may be required to limit their ability to use our products in licensed or otherwise restricted RF spectrum. The operation of our products by network operators in the United States or elsewhere in a manner not in compliance with local law could result in fines, operational disruption, or harm to our reputation.

Our business, operating results and growth rates may be adversely affected by current or future unfavorable economic and market conditions.

Our business depends on the overall demand for wireless network technology and on the economic health and general willingness of our current and prospective end-customers to make those capital commitments necessary to purchase our products. If the conditions in the U.S. and global economies deteriorate, become uncertain or volatile, our business, operating results and financial condition may be materially adversely affected. Economic weakness, end-customer financial difficulties, limited availability of credit and constrained capital spending have resulted, and may in the future result, in challenging and delayed sales cycles, slower adoption of new technologies and increased price competition, and could negatively impact our ability to forecast future periods, which could result in an inability to satisfy demand for our products and a loss of market share.

In particular, we cannot be assured of the level of spending on wireless network technology, the deterioration of which would have a material adverse effect on our results of operations and growth rates. The purchase of our products or willingness to replace existing infrastructure is discretionary and highly dependent on a perception of continued rapid growth in consumer usage of mobile devices and in many cases involves a significant commitment of capital and other resources. Therefore, weak economic conditions or a reduction in capital spending would likely adversely impact our business, operating results and financial condition. A reduction in spending on wireless network technology could occur or persist even if economic conditions improve.

In addition, if interest rates rise or foreign exchange rates weaken for our international customers, overall demand for our products and services could decline and related capital spending may be reduced. Furthermore, any increase in worldwide commodity prices may result in higher component prices for us and increased shipping costs, both of which may negatively impact our financial results.

We may acquire other businesses which could require significant management attention, disrupt our business, dilute shareholder value and adversely affect our operating results.

To execute on our business strategy, we may acquire or make investments in complementary companies, products or technologies such as our August 2019 acquisition of the assets and liabilities of the Xirrus business from Riverbed Technology, Inc. Our integration of the Xirrus business may not be successful and we may not achieve the benefits of the acquisition. We may be unable to acquire and integrate additional companies, products or technologies in a successful manner. We may not be able to find suitable acquisition candidates, and we may not be able to complete such acquisitions on favorable terms, if at all. If we do complete additional acquisitions, we may not ultimately strengthen our competitive position or achieve our goals, and any acquisitions we complete could be viewed negatively by our channel partners, investors and financial analysts. In addition, if we are unsuccessful at integrating such acquisitions, or the technologies associated with such acquisitions, into our company, the revenues and operating results of the combined company could be adversely affected. Any integration process may require significant time and resources, and we may be unable to manage the process successfully. We may not successfully evaluate or utilize the acquired technology or personnel, or accurately forecast the financial impact of an acquisition transaction, including unexpected liability or accounting charges. We may pay cash, incur debt or issue equity securities to pay for any future acquisition, each of which could adversely affect our financial condition or the value of our shares. The sale of equity or issuance of debt to finance any such acquisitions could result in dilution to our shareholders. The incurrence of indebtedness would result in increased fixed obligations and could also include covenants or other restrictions that would impede our ability to manage our operations.

Our credit facility contains restrictive financial covenants that may limit our operating flexibility.

Our credit facility contains certain restrictive covenants that either limit our ability to, or require a mandatory prepayment in the event we, among other things, incur additional indebtedness and liens, merge with other companies or consummate certain changes of control, acquire other companies, engage in new lines of business, change business locations, make certain investments, make any payments on any subordinated debt, transfer or dispose of assets, amend certain material agreements, and enter into various specified transactions. We, therefore, may not be able to engage in any of the foregoing transactions unless we obtain the consent of our lenders or prepay certain amounts under the credit facility. The credit facility also contains certain financial covenants and financial reporting requirements. We have in the past, and may in the future, fail to comply with all of the financial or restrictive covenants of our credit facility, requiring a waiver from our lenders. Our obligations under the credit facility are secured by substantially all of our assets. We may not be able to generate or sustain sufficient cash flow or sales to meet the financial covenants or pay the principal and interest under the credit facility, and we may in the future be unable to meet our financial covenants, requiring additional waivers that our lenders may be unwilling to grant. Furthermore, our future working capital, proceeds of borrowings or proceeds of equity financings could be required to be used to repay or refinance the amounts outstanding under the credit facility and, therefore, may be unavailable for other purposes. In the event of a liquidation, our lenders would be repaid all outstanding principal and interest prior to distribution of assets to unsecured creditors, and the holders of our shares would receive a portion of any liquidation proceeds only if all of our creditors, including our lenders, were first repaid in full.

The elimination of LIBOR could adversely affect our business, results of operations or financial condition.

In July 2017, the head of the United Kingdom Financial Conduct Authority announced plans to phase out the use of LIBOR by the end of 2021. Although the impact is uncertain at this time, the elimination of LIBOR could have an adverse impact on our business, results of operations, or financial condition. We may incur significant expenses to amend our LIBOR-indexed loans, and other applicable financial or contractual obligations, including our credit facilities, to a new reference rate, which may differ significantly from LIBOR. Accordingly, the use of an alternative rate could result in increased costs, including increased interest expense on our credit facilities, and increased borrowing and hedging costs in the future. At this time, no consensus exists as to what rate or rates may become acceptable alternatives to LIBOR and we are unable to predict the effect of any such alternatives on our business, results of operations or financial condition.

We may face exposure to unknown tax liabilities, which could adversely affect our financial condition, cash flows and results of operations .

We are subject to income and non-income based taxes in the United States and in various non-U.S. jurisdictions. We file U.S. federal income tax returns as well as income tax returns in various U.S. state and local jurisdictions and many non-U.S. jurisdictions. The United States, United Kingdom, India, Mexico, and Brazil are the main taxing jurisdictions in which we operate. Significant judgment is required in dealing with uncertainties in the application of complex tax regulations when calculating our worldwide income tax liabilities and other tax liabilities. We are not aware of any uncertain tax positions as specified by Accounting Standards Codification 740, *Income Taxes*. We expect to continue to benefit from our implemented tax positions. We believe that our tax positions comply with applicable tax law and intend to vigorously defend our positions. However, as described below, tax authorities could take differing positions on certain issues.

We may be subject to income tax audits in all the jurisdictions in which we operate. The years open for audit vary depending on the tax jurisdiction. In the United States, we are no longer subject to U.S. federal income tax examinations by tax authorities for years before 2016. In the non-U.S. jurisdictions, the tax returns that are open vary by jurisdiction and are generally for tax years between 2013 through 2019. We routinely assess exposures to any potential issues arising from current or future audits of current and prior years' tax returns. When assessing such potential exposures and where necessary, we provide a reserve to cover any expected loss. To the extent that we establish a reserve, we increase our provision for income taxes. If we ultimately determine that payment of these amounts is unnecessary, we reverse the liability and recognize a tax benefit during the period in which we determine that the liability is no longer necessary. We record an additional charge in our provision for taxes in the period in which we determine that tax liability is greater than the original estimate. If the governing tax authorities have a differing interpretation of the applicable law, a successful challenge of any of our tax positions could adversely affect our financial condition, cash flows and/or results of operations.

Our business is subject to the risks of earthquakes, fire, floods and other catastrophic events, and to interruption by manmade problems such as network security breaches, computer viruses, terrorism and war.

We have substantial operations in Illinois, California, England and India, and our third-party manufacturers are predominantly located in Mexico, China, Taiwan and Israel. Operations in some of these areas are susceptible to disruption due to severe weather, seismic activity, political unrest and other factors. For example, a significant natural disaster, such as an earthquake, a fire or a flood, occurring at the facilities of one of our third-party manufacturers could have a material adverse impact on their ability to manufacture and timely deliver our products. In addition, due to the current fears over the spread of the coronavirus that commenced in China, our third-party manufacturers in China may experience disruption of their operations. Despite the implementation of network security measures, we also may be vulnerable to computer viruses, break-ins and similar disruptions from unauthorized tampering with our solutions. In addition, natural disasters, acts of terrorism or war could cause disruptions in the businesses of our suppliers, manufacturers, network operators or the economy as a whole. To the extent that any such disruptions result in delays or cancellations of orders or impede our ability to timely deliver our products, or the deployment of our products, our business, operating results and financial condition would be adversely affected.

Risks related to our industry

New regulations or standards or changes in existing regulations or standards in the United States or internationally related to our products may result in unanticipated costs or liabilities, which could have a material adverse effect on our business, results of operations and future sales.

Our products are subject to governmental regulations in a variety of jurisdictions. To achieve and maintain market acceptance, our products must comply with these regulations as well as a significant number of industry standards. In the United States, our products must comply with various regulations defined by the Federal Communications Commission, or FCC, Underwriters Laboratories and others. We must also comply with similar international regulations. In addition, radio emissions, such as our products, are subject to health and safety regulation in the United States and in other countries in which we do business, including by the Center for Devices and Radiological Health of the Food and Drug Administration, the Occupational Safety and Health Administration and various state agencies. Member countries of the European Union have enacted similar standards concerning electrical safety and electromagnetic compatibility and emissions, and chemical substances and use standards. As these regulations and standards evolve, and if new regulations or standards are implemented, we could be required to modify our products or develop and support new versions of our products, and our compliance with these regulations and standards may become more burdensome. The failure of our products to comply, or delays in compliance, with the various existing and evolving industry regulations and standards could prevent or delay introduction of our products, which could harm our business. Foreign regulatory agencies may delay or fail to certify our products for political or other reasons other than product quality or performance. Network operator uncertainty regarding future policies may also affect demand for wireless broadband products, including our products. Our inability to alter our products to address these requirements and any regulatory changes may have a material adverse effect on our business, operating results and financial condition.

We are subject to governmental export and import controls that could impair our ability to compete in international markets and subject us to liability if we are not in compliance with applicable laws.

Our technology and products are subject to export control and import laws and regulations, including the U.S. Export Administration Regulations, U.S. customs regulations, the economic and trade sanctions regulations administered by the U.S. Treasury Department’s Office of Foreign Assets Controls, and applicable U.K. export and import laws and regulations. Exports, re-exports and transfers of our products and technology must be made in compliance with these laws and regulations. U.S. and U.K. export control laws and economic sanctions include a prohibition on the shipment of certain products and technology to embargoed or sanctioned countries, governments and persons. We take precautions to prevent our products and technology from being shipped to, downloaded by or otherwise transferred to applicable sanctions targets, but our products could be shipped to those targets by our channel partners despite such precautions. If our products are shipped to or downloaded by sanctioned targets in the future in violation of applicable export laws, we could be subject to government investigations, penalties and reputational harm. Certain of our products incorporate encryption technology and may be exported, re-exported or transferred only with the required applicable export license from the U.S. or the U.K. or through an export license exception.

If we fail to comply with applicable export and import regulations, customs and trade regulations, and economic sanctions and other laws, we could be subject to substantial civil and criminal penalties, including fines and incarceration for responsible employees and managers, and the possible loss of export or import privileges as well as harm our reputation and indirectly have a material adverse effect on our business, operating results and financial condition. In addition, if our channel partners fail to comply with applicable export and import regulations, customs regulations, and economic and sanctions and other laws in connection with our products and technology, then we may also be adversely affected, through reputational harm and penalties. Obtaining the necessary export license for a particular sale may be time-consuming, may result in the delay or loss of sales opportunities and approval is not guaranteed.

Any change in export or import, customs or trade and economic sanctions laws, and regulations, shift in the enforcement or scope of existing laws and regulations, or change in the countries, governments, persons or technologies targeted by such laws and regulations, could also result in decreased use of our products, or in our decreased ability to export or sell our products to existing or potential network operators with international operations. Any decreased use of our products or limitation on our ability to export or sell our products could affect our business, financial condition and results of operations.

We do business in countries with a history of corruption and transact business with foreign governments, which increases the risks associated with our international activities.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA, the U.K. Bribery Act of 2010, and many other laws around the world that prohibit improper payments or offers or authorization of payments to governments and their employees, officials, and agents and political parties for the purpose of obtaining or retaining business, inducing an individual to not act in good faith, direct business to any person, or secure any advantage. We have operations, deal with and make sales to governmental entities in countries known to experience corruption, particularly certain emerging countries in Asia, Eastern Europe, the Middle East and South America. Our activities in these countries create the risk of illegal or unauthorized payments or offers of payments or other things of value by our employees, consultants or channel partners that could be in violation of applicable anti-corruption laws, including the FCPA. In many foreign countries where we operate, particularly in countries with developing economies, it may be a local custom for businesses to engage in practices that are prohibited by the FCPA or other similar laws and regulations. Although we have taken actions to discourage and prevent illegal practices including our anti-corruption compliance policies, procedures, training and monitoring, the actions taken to safeguard against illegal practices, and any future improvements in our anti-corruption compliance practices, may not be effective, and our employees, consultants or channel partners may engage in illegal conduct for which we might be held responsible. Violations of anti-corruption laws may result in severe criminal or civil sanctions, including suspension or debarment from government contracting, and we may be subject to other liabilities and significant costs for investigations, litigation and fees, diversion of resources, negative press coverage, or reputational harm, all of which could negatively affect our business, operating results and financial condition. In addition, the failure to create and maintain accurate books and records or the failure to maintain an adequate system of internal accounting controls may subject us to sanctions.

If we fail to comply with environmental requirements, our business, financial condition, operating results and reputation could be adversely affected.

We are subject to various environmental laws and regulations including laws governing the hazardous material content of our products and laws relating to the recycling of electrical and electronic equipment. The laws and regulations to which we are subject include the European Union’s Restriction of Hazardous Substances Directive, or RoHS, and Waste Electrical and Electronic Equipment Directive, or WEEE, as implemented by EU member states. Similar laws and regulations exist or are pending in other regions, including in the United States, and we are, or may in the future be, subject to these laws and regulations.

RoHS restricts the use of certain hazardous materials, including lead, mercury and cadmium, in the manufacture of certain electrical and electronic products, including some of our products. We have incurred, and expect to incur in the future, costs to comply with these laws, including research and development costs, and costs associated with assuring the supply of compliant components. Certain of our products are eligible for an exemption for lead used in network infrastructure equipment. If this exemption is revoked, or if there are other changes to RoHS (or its interpretation) or if similar laws are passed in other jurisdictions, we may be required to reengineer our products to use components compatible with these regulations. This reengineering and component substitution could result in additional costs to us or disrupt our operations or logistics.

WEEE requires producers of electrical and electronic equipment to be responsible for the collection, reuse, recycling and treatment of their products. Currently, our distributors generally take responsibility for this requirement, as they are often the importer of record. However, changes to WEEE and existing or future laws similar to WEEE may require us to incur additional costs in the future.

If we are unable to comply with these or similar laws or regulations, we could incur fines, penalties, restrictions on our ability to manufacture our products or restrictions or limitations on our ability to import or export our products to or from various jurisdictions.

Any failure to comply with current and future environmental laws could result in the incurrence of fines or penalties and could adversely affect the demand for or sales of our products.

If we were not able to satisfy data protection, security, privacy and other government- and industry-specific requirements or regulations, our business, results of operations and financial condition could be harmed.

Personal privacy, data protection, information security and telecommunications-related laws and regulations have been widely adopted in the United States, Europe and in other jurisdictions where we offer our products. The regulatory frameworks for these matters, including privacy, data protection and information security matters, is rapidly evolving and is likely to remain uncertain for the foreseeable future. We expect that there will continue to be new proposed laws, regulations and industry standards concerning privacy, data protection, information security and telecommunications services in the United States, the European Union and other jurisdictions in which we operate or may operate, and we cannot yet determine the impact such future laws, regulations and standards may have on our business. For example, the European Commission adopted the General Data Protection Regulation, effective in May 2018, that supersedes prior EU data protection legislation, imposes more stringent EU data protection requirements and imposes greater penalties for noncompliance. Additionally, California enacted the California Consumer Privacy Act of 2018, which took effect on January 1, 2020, and broadly defines personal information, gives California residents expanded privacy rights and protections and provides for civil penalties for violations. We understand that additional states as well as other countries around the world are also in the process of enacting or amending data protection, security, and privacy regulations. We also expect that existing laws, regulations and standards may be interpreted in new manners in the future. Future laws, regulations, standards and other obligations, and changes in the interpretation of existing laws, regulations, standards and other obligations could require us to modify our products, restrict our business operations, increase our costs and impair our ability to maintain and grow our channel partner base and increase our revenues. The cost of compliance with, and other burdens imposed by, the GDPR, CCPA and other new privacy laws may limit the use and adoption of our products and services and could have an adverse impact on our business, results of operations and financial condition.

Although we work to comply with applicable privacy and data security laws and regulations, industry standards, contractual obligations and other legal obligations, those laws, regulations, standards and obligations are evolving and may be modified, interpreted and applied in an inconsistent manner from one jurisdiction to another, and may conflict with one another. As such, we cannot assure ongoing compliance with all such laws, regulations, standards and obligations. Any failure or perceived failure by us to comply with applicable laws, regulations, standards or obligations, or any actual or suspected security incident, whether or not resulting in unauthorized access to, or acquisition, release or transfer of personally identifiable information or other data, may result in governmental enforcement actions and prosecutions, private litigation, fines and penalties or adverse publicity, and could cause channel partners to lose trust in us, which could have an adverse effect on our reputation and business.

Risks related to our intellectual property

We rely on the availability of third-party licenses, the loss of which could materially harm our ability to sell our products.

We rely on certain software or other intellectual property licensed from third parties. It may be necessary in the future to seek new licenses or renew existing licenses. There can be no assurance that the necessary licenses would be available on acceptable terms, if at all. If we are unable to maintain these licenses, or obtain licenses to alternative third-party intellectual property, on acceptable terms, we may be precluded from selling our products, may be required to re-design our products to eliminate reliance on such third-party intellectual property or otherwise experience disruption in operating our business. Third parties owning such intellectual property may engage in litigation against us seeking protection of their intellectual property rights, any of which could have a material adverse effect on our business, operating results, and financial condition.

If we are unable to protect our intellectual property rights, our competitive position could be harmed or we may incur significant expenses to enforce our rights.

We protect our proprietary information and technology through license agreements, nondisclosure agreements, noncompetition covenants, and other contractual provisions and agreements, as well as through patent, trademark, copyright and trade secret laws in the United States and similar laws in other countries. These protections may not be available in all jurisdictions and may be inadequate to prevent our competitors or other third-party manufacturers from copying, reverse engineering or otherwise obtaining and using our technology, proprietary rights or products. For example, the laws of certain countries in which our products are manufactured or licensed do not protect our proprietary rights to the same extent as the laws of the United States. In addition, third parties may seek to challenge, invalidate or circumvent our patents, trademarks, copyrights and trade secrets, or applications for any of the foregoing. We have focused patent, trademark, copyright and trade secret protection primarily in the United States and Europe, although we distribute our products globally. As a result, we may not have sufficient protection of our intellectual property in all countries where infringement may occur. There can be no assurance that our competitors will not independently develop technologies that are substantially equivalent or superior to our technology or design around our proprietary rights. In each case, our ability to compete could be significantly impaired. To prevent substantial unauthorized use of our intellectual property rights, it may be necessary to prosecute actions for infringement and/or misappropriation of our proprietary rights against third parties. Any such action could result in significant costs and diversion of our resources and management’s attention, and we may not be successful in such action.

Claims by others that we infringe their intellectual property rights could harm our business.

Our industry is characterized by vigorous protection and pursuit of intellectual property rights. A number of companies hold a large number of patents that may cover technology necessary to our products. We have in the past received and expect to continue to receive claims by third parties that we infringe their intellectual property rights. For example, on August 7, 2018, Ubiquiti Networks, Inc. filed a lawsuit, which we refer to as the Ubiquiti Litigation, in the United States District Court, Northern District of Illinois, against us, two of our employees, one of our distributors and one of our end users. The complaint alleged that our development of and sales and promotion of our Elevate software as downloaded on a Ubiquiti device violates the Computer Fraud and Abuse Act and Illinois Computer Crimes Prevention Law, the Digital Millennium Copyright Act and the Copyright Act and constitutes misrepresentation and false advertising and false designation of origin in violation of the Lanham Act and state competition laws, breach of contract, tortious interference with contract and unfair competition, and trademark infringement and common law misappropriation. The complaint also asserted additional claims against all defendants alleging that the development and sales of Elevate violated the Racketeer Influenced and Corrupt Organizations Act. On May 22, 2019, the Court issued its order dismissing Ubiquiti's complaint without prejudice. On June 18, 2019, Ubiquiti filed its First Amended Complaint (FAC). The FAC made substantially the same claims against the same parties with the exception that the FAC does not include claims for violation of the Illinois Computer Crime Prevention Law, Infringement of Registered Trademarks, False Designation of Origin, and Common Law Trademark Misappropriation that were included in the initial complaint. We filed a motion to dismiss the FAC on July 10, 2019. On November 14, 2019 the Court issued an order denying our motion to dismiss. The Court ordered that fact discovery will close on August 18, 2020 and that dispositive motions must be filed prior to December 22, 2020. The Court referred the case to a magistrate judge for a potential settlement conference. There can be no assurance that we will prevail in the lawsuit.

In addition, we have received correspondence from certain patent holding companies who assert that we infringe certain patents related to wireless communication technologies. A court adjudicating a claim that we infringe these patents may not rule in our favor should these patent holding companies file suit against us. As our business expands, we enter into new technologies, and the number of products and competitors in our market increases, we expect that infringement claims may increase in number and significance. It is not uncommon for suppliers of certain components of our products, such as chipsets, to be involved in intellectual property-related lawsuits by or against third parties. Our key component suppliers are often targets of such assertions, and we may become a target as well. Any claims or proceedings against us, whether meritorious or not, could be time-consuming, result in costly litigation, require significant amounts of management time or result in the diversion of significant operational resources, any of which could materially and adversely affect our business and operating results.

Intellectual property lawsuits are subject to inherent uncertainties due to the complexity of the technical issues involved, and we cannot be certain that we will be successful in defending ourselves against intellectual property claims. In addition, we currently have a limited portfolio of issued patents compared to our larger competitors, and therefore may not be able to effectively utilize our intellectual property portfolio to assert defenses or counterclaims in response to patent infringement claims or litigation brought against us by third parties. Patent holding companies may seek to monetize patents they previously developed, have purchased or otherwise obtained. Many companies, including our competitors, may now, and in the future, have significantly larger and more mature patent portfolios than we have, which they may use to assert claims of infringement, misappropriation and other violations of intellectual property rights against us. In addition, future litigation may involve non-practicing entities or other patent owners who have no relevant products or revenue and against whom our own patents may therefore provide little or no deterrence or protection, and many other potential litigants have the capability to dedicate substantially greater resources than we do to enforce their intellectual property rights and to defend claims that may be brought against them.

A successful claimant could secure a judgment that requires us to pay substantial damages or prevents us from distributing certain products, obtaining the services of certain employees or independent contractors, or performing certain services. In addition, we might be required to seek a license for the use of such intellectual property, which may not be available on commercially acceptable terms or at all. Alternatively, we may be required to develop non-infringing technology, which could require significant effort and expense and may ultimately not be successful. Any claims or proceedings against us, whether meritorious or not, could be time consuming, result in costly litigation, require significant amounts of management time, result in the diversion of significant operational resources, or require us to enter into royalty or licensing agreements.

Although we may be able to seek indemnification from our component suppliers and certain of our third-party manufacturers who have provided us with design and build services, these third-party manufacturers or component suppliers may contest their obligations to indemnify us, or their available assets or indemnity obligation may not be sufficient to cover our losses.

Our obligations to indemnify our channel partners and network operators against intellectual property infringement claims could cause us to incur substantial costs.

We have agreed, and expect to continue to agree, to indemnify our channel partners and network operators for certain intellectual property infringement claims, such as the Ubiquiti Litigation. If intellectual property infringement claims are made against our channel partners or network operators concerning our products, we could be required to indemnify them for losses resulting from such claims or to refund amounts they have paid to us. The maximum potential amount of future payments we could be required to make may be substantial or unlimited and could materially harm our business. We may in the future agree to defend and indemnify our distributors, network operators and other parties, even if we do not believe that we have an obligation to indemnify them or that our services and products infringe the asserted intellectual property rights. Alternatively, we may reject certain of these indemnity demands, which may lead to disputes with a distributor, network operator or other party and may negatively impact our relationships with the party demanding indemnification or result in litigation against us.

If our third-party manufacturers do not respect our intellectual property and trade secrets and produce competitive products using our design, our business would be harmed.

We outsource manufacture, and in some cases hardware or software design, to third-party manufacturers predominantly in Mexico, China, and Taiwan. Prosecution of intellectual property infringement and trade secret theft is more difficult in some of these jurisdictions than in the United States. Although our agreements with our third-party manufacturers generally preclude them from misusing our intellectual property and trade secrets, or using our designs to manufacture product for our competitors, we may be unsuccessful in monitoring and enforcing our intellectual property rights and may find counterfeit goods in the market being sold as our products or products similar to ours produced for our competitors using our intellectual property. Although we take steps to stop counterfeits, we may not be successful and network operators who purchase these counterfeit goods may experience product defects or failures, harming our reputation and brand and causing us to lose future sales.

We use open source software in our products that may subject our firmware to general release or require us to re-engineer our products and the firmware contained therein, which may cause harm to our business.

We incorporate open source software into our products. Use and distribution of open source software may entail greater risks than use of third-party commercial software, as open source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of the software code. Some open source licenses contain requirements that we make available source code for modifications or derivative works we create based upon the open source software and that we license such modifications or derivative works under the terms of a particular open source license or other license granting third parties certain rights of further use. If we combine our proprietary firmware or other software with open source software in a certain manner, we could, under certain of the open source licenses, be required to release our proprietary source code publicly or license such source code on unfavorable terms or at no cost. Open source license terms relating to the disclosure of source code in modifications or derivative works to the open source software are often ambiguous and few if any courts in jurisdictions applicable to us have interpreted such terms. As a result, many of the risks associated with usage of open source software cannot be eliminated, and could, if not properly addressed, negatively affect our business.

If we were found to have inappropriately used open source software, we may be required to release our proprietary source code, re-engineer our firmware or other software, discontinue the sale of our products in the event re-engineering cannot be accomplished on a timely basis or take other remedial action that may divert resources away from our development efforts, any of which could adversely increase our expenses and delay our ability to release our products for sale. We could also be subject to similar conditions or restrictions should there be any changes in the licensing terms of the open source software incorporated into our products.

Risks related to ownership of our ordinary shares

Because Vector Capital holds a controlling interest in us, the influence of our public shareholders over significant corporate actions will be limited.

Affiliates of Vector Capital directly or indirectly own approximately 75% of our outstanding shares through their ownership of Vector Cambium Holdings (Cayman), L.P., or VCH, L.P. As a result, Vector Capital has the power to:

- control all matters submitted to our shareholders;
- elect our directors; and
- exercise control over our business, policies and affairs.

Vector Capital is not prohibited from selling its interest in us to third parties. Accordingly, our ability to engage in significant transactions, such as a merger, acquisition or liquidation, is limited without the consent of Vector Capital. Conflicts of interest could arise between us and Vector Capital, and any conflict of interest may be resolved in a manner that does not favor us. Vector Capital may continue to retain control of us for the foreseeable future and may decide not to enter into a transaction in which our shareholders would receive consideration for their shares that is much higher than the cost to them or the then-current market price of those shares. In addition, Vector Capital could elect to sell a controlling interest in us and shareholders may receive less than the then-current fair market value or the price paid for their shares. Any decision regarding their ownership of us that Vector Capital may make at some future time will be in their absolute discretion.

In addition, pursuant to the terms of our Amended and Restated Memorandum and Articles of Association, Vector Capital and its affiliates have the right to, and have no duty to abstain from, exercising its right to engage or invest in the same or similar business as us, and do business with any of our channel partners, distributors, network operators and any other party with which we do business. In the event that any of our directors or officers who is also a director, officer or employee of Vector Capital or its affiliates acquires knowledge of a corporate opportunity or is offered a corporate opportunity, then Vector Capital or its affiliates may pursue or acquire such corporate opportunity without presenting the corporate opportunity to us without liability, and to the maximum extent permitted by applicable law, such relevant director will be deemed to have fully satisfied their fiduciary duty if the knowledge of such corporate opportunity was not acquired solely in such person's capacity as our director or officer and such person acted in good faith.

In addition, pursuant to our Amended and Restated Memorandum and Articles of Association, a director who is in any way interested in a contract or transaction with us will declare the nature of his interest at a meeting of the board of directors. A director may vote in respect of any such contract or transaction notwithstanding that he may be interested therein and if he does so his vote will be counted and he may be counted in the quorum at any meeting of the board of directors at which any such contract or transaction shall come before the meeting of the board of directors for consideration. We have adopted a written audit committee charter, pursuant to which the audit committee must review all related party transactions required to be disclosed in our financial statements and approve any such related party transaction, unless the transaction is approved by another independent committee of our board.

We are a controlled company within the meaning of Nasdaq rules and, as a result, we qualify for and are relying on exemptions from certain corporate governance requirements.

Vector Capital controls a majority of the voting power of our outstanding shares and as a result, we are a controlled company within the meaning of the corporate governance standards of the Nasdaq. Under Nasdaq rules, a controlled company may elect not to comply with certain corporate governance requirements of the Nasdaq, including the requirements that:

- a majority of the board of directors consist of independent directors;
- the nominating and corporate governance committee be composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities;
- the compensation committee be composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities; and
- there be an annual performance evaluation of the nominating and corporate governance and compensation committees.

We are utilizing these exemptions, including the exemption for a board of directors composed of a majority of independent directors. In addition, although we have adopted charters for our audit and compensation committees and intend to conduct annual performance evaluations for these committees, none of these committees are or will in the foreseeable future be composed entirely of independent directors. We are relying on the phase-in rules of the SEC and Nasdaq with respect to the audit committee. These rules permit us to have an audit committee that is comprised of one independent member at the time of the effectiveness of our registration statement for our IPO which occurred on June 25, 2019, a majority of members that are independent within 90 days thereafter, and all members that are independent within one year thereafter. Accordingly, shareholders may not have the same protections afforded to shareholders of companies that are subject to all of the corporate governance requirements of Nasdaq.

The price of our shares may be volatile, and shareholders could lose all or part of their investment.

The trading price of our shares may fluctuate substantially. The trading price of our shares will depend on a number of factors, including those described in this "Risk factors" section, many of which are beyond our control and may not be related to our operating performance. These fluctuations could cause shareholders to lose all or part of their investment in our shares since they might be unable to sell their shares at or above the price paid for them. Factors that could cause fluctuations in the trading price of our shares include the following:

- the financial projections we may provide to the public, any changes in those projections or our failure to meet those projections;
- actual or anticipated developments in our business or our competitors' businesses or the competitive landscape generally;
- sales of our shares by us or our shareholders or hedging activities by market participants;
- failure of financial analysts to maintain coverage of us, changes in financial estimates by any analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- operating performance or stock market valuations of other technology companies generally, or those in our industry in particular;
- announced or completed acquisitions of businesses or technologies by us or our competitors;
- general economic conditions and slow or negative growth of our markets;
- rumors and market speculation involving us or other companies in our industry;
- litigation involving us, our industry or both or investigations by regulators into our operations or those of our competitors;
- developments or disputes concerning our intellectual property or other proprietary rights;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- changes in accounting standards, policies, guidelines, interpretations or principles;
- any major change in our management; and
- other events or factors, including those resulting from war, incidents of terrorism or responses to these events.

In addition, the stock market in general, and the market for technology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may seriously affect the market price of our shares, regardless of our actual operating performance. In the past, following periods of volatility in the overall market and the market prices of particular companies' securities, securities class action litigations have often been instituted against these companies. Litigation of this type, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Our memorandum and articles of association contain anti-takeover provisions that could have a material adverse effect on the rights of holders of our shares.

Our Amended and Restated Memorandum and Articles of Association contain provisions to limit the ability of others to acquire control of our company through non-negotiated transactions. These provisions could have the effect of depriving our shareholders of an opportunity to sell their shares at a premium over prevailing market prices by discouraging third parties from seeking to obtain control of our company in a tender offer or similar transaction. For example, our board of directors has the authority to issue undesignated, or "blank-check," preferred shares without shareholder approval. As a result, our board of directors could authorize and issue a series of preferred shares with terms calculated to delay or prevent a change in control of our company or make removal of management more difficult, which may not be in the interests of holders of our ordinary shares. In addition, our board is staggered and divided into three classes, with each class subject to re-election once every three years on a rotating basis, special meeting of shareholders may only be called by a specified group of directors, executives or shareholders and shareholders must comply with advance notice provisions in order to bring business before or nominate directors for election at shareholder meetings. As a result, shareholders would be prevented from electing an entirely new board of directors at any annual meeting and the ability of shareholders to change the membership of a majority of our board of directors may be delayed.

Because we are incorporated under Cayman Islands law, shareholders may face difficulties in protecting their interests, and the ability to protect rights through U.S. courts may be limited.

We are an exempted company incorporated under the laws of the Cayman Islands. Our corporate affairs are governed by our Amended and Restated Memorandum and Articles of Association, the Companies Law (2018 Revision) of the Cayman Islands and the common law of the Cayman Islands. The rights of shareholders to take action against the directors, actions by minority shareholders and the fiduciary responsibilities of our directors to us under Cayman Islands law are governed by the common law of the Cayman Islands and we have adopted an exclusive forum by law that requires certain shareholder litigations regarding such matters to be brought in Cayman Islands Courts. These exclusive forum provisions do not apply to claims under U.S. federal securities laws. The common law of the Cayman Islands is derived in part from comparatively limited judicial precedent in the Cayman Islands as well as from the common law of England, the decisions of whose courts are of persuasive authority, but are not binding, on a court in the Cayman Islands. The rights of our shareholders and the fiduciary responsibilities of our directors under Cayman Islands law are not as clearly established as they would be under statutes or judicial precedent in some jurisdictions in the United States. In particular, the Cayman Islands has a less developed body of securities laws than the United States. Some U.S. states, such as Delaware, have more fully developed and judicially interpreted bodies of corporate law than the Cayman Islands.

Shareholders of Cayman Islands exempted companies like us have no general rights under Cayman Islands law to inspect corporate records or to obtain copies of lists of shareholders of these companies. Our directors have discretion under our existing articles of association to determine whether or not, and under what conditions, our corporate records may be inspected by our shareholders, but are not obliged to make them available to our shareholders. This may make it more difficult for shareholders to obtain the information needed to establish any facts necessary for a shareholder motion or to solicit proxies from other shareholders in connection with a proxy contest.

In addition, the Cayman Islands courts are also unlikely (1) to recognize or enforce against us judgments of courts of the United States based on certain civil liability provisions of U.S. securities laws, or (2) to impose liabilities against us, in original actions brought in the Cayman Islands, based on certain civil liability provisions of U.S. securities laws that are penal in nature. There is no statutory recognition in the Cayman Islands of judgments obtained in the United States, although the courts of the Cayman Islands will in certain circumstances recognize and enforce a foreign judgment of a foreign court of competent jurisdiction without any re-examination of the merits at common law.

As a result of all of the above, our public shareholders may have more difficulty in protecting their interests in the face of actions taken by management, members of the board of directors or large shareholders than they would as shareholders of a public company incorporated in the United States.

We are an emerging growth company, and any decision on our part to comply only with certain reduced disclosure requirements applicable to emerging growth companies could make our shares less attractive to investors.

We are an emerging growth company, as defined in the JOBS Act, and, for as long as we continue to be an emerging growth company, we may choose to take advantage of exemptions from various reporting requirements applicable to other public companies but not to emerging growth companies, including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and shareholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years, although if the market value of our shares that is held by non-affiliates exceeds $700 million as of any June 30 before that time or if we have total annual gross revenues of $1.07 billion or more during any fiscal year before that time, we would cease to be an emerging growth company as of the end of that fiscal year, or if we issue more than $1 billion in non-convertible debt in a three-year period, we would cease to be an emerging growth company immediately. Investors may find our shares less attractive because we choose to rely on these exemptions. If some investors find our shares less attractive as a result of our choice to reduce our disclosures, there may be a less active trading market for our shares and our share price may be more volatile.

Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Our directors may have conflicts of interest because of their ownership of equity interests of, and their employment with, our parent company and our affiliates.

Two of our directors hold ownership interests in Vector Capital as well as ownership in and employment positions with its affiliates. Ownership interests in Vector Capital by our directors could create, or appear to create, potential conflicts of interest when our directors are faced with decisions that could have different implications for us and for Vector Capital or its affiliates. Conflicts of interest may not be resolved in our favor.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

As of December 31, 2019, we occupied approximately 38,000 square feet of office space in Rolling Meadows, Illinois under lease agreements that expire in 2024, where we have corporate and executive functions, research and development, customer support, operations and administration and finance services. We also lease approximately 27,000 square feet of office space in Ashburton, England under lease agreements all of which expire in 2026, approximately 32,000 square feet of space in Bangalore, India under two leases that expire in 2021, approximately 9,000 square feet of office space in San Jose, California under a lease that expires in 2022, and approximately 9,000 square feet of office space in Thousand Oaks, California under a lease that expires in 2022. In addition, we maintain offices in Miami, Florida, Italy, Dubai, Mexico and Singapore.

For additional information regarding obligations under operating leases, see Note 18 - Leases in the Notes to the Consolidated Financial Statements included in Part II, Item 8: "Financial Statements and Supplementary Data" of this Annual Report on Form 10-K.

Item 3. Legal Proceedings.

Third parties may from time to time assert legal claims against us.

Our industry is characterized by vigorous protection and pursuit of intellectual property rights. A number of companies hold a large number of patents that may cover technology necessary to our products. We have in the past received and expect to continue to receive claims by third parties that we infringe their intellectual property rights. For example, on August 7, 2018, Ubiquiti Networks, Inc. filed a lawsuit, which we refer to as the Ubiquiti Litigation, in the United States District Court, Northern District of Illinois, against us, two of our employees, one of our distributors and one of our end users. The complaint alleged that our development of and sales and promotion of our Elevate software as downloaded on a Ubiquiti device violates the Computer Fraud and Abuse Act and Illinois Computer Crimes Prevention Law, the Digital Millennium Copyright Act and the Copyright Act and constitutes misrepresentation and false advertising and false designation of origin in violation of the Lanham Act and state competition laws, breach of contract, tortious interference with contract and unfair competition, and trademark infringement and common law misappropriation. The complaint also asserted additional claims against all defendants alleging that the development and sales of Elevate violated the Racketeer Influenced and Corrupt Organizations Act. On May 22, 2019, the Court issued its order dismissing Ubiquiti's complaint without prejudice. On June 18, 2019, Ubiquiti filed its First Amended Complaint (FAC). The FAC made substantially the same claims against the same parties with the exception that the FAC does not include claims for violation of the Illinois Computer Crime Prevention Law, Infringement of Registered Trademarks, False Designation of Origin, and Common Law Trademark Misappropriation that were included in the initial complaint. We filed a motion to dismiss the FAC on July 10, 2019. On November 14, 2019 the Court issued an order denying our motion to dismiss. The Court ordered that fact discovery will close on August 18, 2020 and that dispositive motions must be filed prior to December 22, 2020. The Court referred the case to a magistrate judge for a potential settlement conference. There can be no assurance that we will prevail in the lawsuit.

Item 4. Mine Safety Disclosures.

Not applicable.

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

Market information

Our ordinary shares are listed on the NASDAQ Global Market under the symbol “CMBM”. The following table sets forth for the periods indicated the high and low intra-day sale prices per share of our ordinary shares as reported on the NASDAQ Global Market:

	High	Low
Year ended December 31, 2019		
Second quarter (from June 26, 2019)	$ 10.50	$ 8.50
Third quarter	$ 11.75	$ 8.04
Fourth quarter	$ 9.96	$ 5.75

On March 18, 2020, the last reported sale price of our ordinary shares on the NASDAQ Global Market was $4.53 per share, and there were 243 holders of record of our ordinary shares. The actual number of holders of ordinary shares is greater than these numbers of record holders and includes stockholders who are beneficial owners, but whose shares are held in street name by brokers and nominees. The number of holders of record also does not include shareholders whose shares may be held in trust by other entities.

Recent sale of unregistered securities

Just prior to our initial public offering, we effected a recapitalization as described in our Prospectus filed with the Securities and Exchange Commission dated June 25, 2019, which comprised (i) an increase in the authorized and outstanding shares held by Vector Cambium Holdings (Cayman), L.P., or VCH L.P., and (ii) an exchange of the vested share-based compensation awards held by our employees in VCH L.P. for our shares and unvested share-based compensation awards for restricted shares or restricted share units issued by us, each on a value-for-value basis. As a result, and based on the IPO price of $12.00, we issued (a) 17,627,575 shares to VCH, L.P. and (b) 2,220,788 shares to our employees and service providers, of which 91,125 shares were withheld from the employees and services providers in net settlement of amounts due.

Use of proceeds from Initial Public Offering of ordinary shares

On June 28, 2019, we completed our IPO in which we sold 5,800,000 ordinary shares at a price of $12.00 per share. The offer and sale of all of the shares in the IPO were registered under the Securities Act pursuant to a registration statement on Form S-1 (File No. 333-21789), which was declared effective by the SEC on June 25, 2019. We raised approximately $61.4 million in net proceeds after deducting underwriting discounts and commissions of $3.6 million and $4.6 million for offering expenses. We used a portion of the proceeds to pay down debt of $30.7 million on July 1, 2019, to pay $5.6 million on July 3, 2019 to Vector Capital Management, an affiliate of (i) Vector Cambium Holdings (Cayman), L.P., who owns 75% of our outstanding ordinary shares and (ii) Robert Amen and Alexander Slusky, members of our board of directors. The managing underwriters of our IPO were J.P. Morgan Securities LLC and Goldman Sachs & Co. LLC. In addition, on August 5, 2019, we used $2.0 million of the net proceeds to pay to Riverbed Technology, Inc. the initial purchase price of the acquisition of assets and liabilities of its Xirrus Wi-Fi business, and through February 2020, paid the full $3.0 million of remaining consideration to Riverbed Technology, Inc.

Dividend policy

We have not declared or paid dividends on our ordinary shares since our IPO. Neither Cayman Island law nor our amended and restated certificate of incorporation requires our board of directors to declare dividends on our ordinary shares. Any future determination to declare cash dividends on our ordinary shares will be made at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements, general business conditions and other factors that our board of directors may deem relevant. We do not anticipate paying cash dividends on our ordinary shares for the foreseeable future.

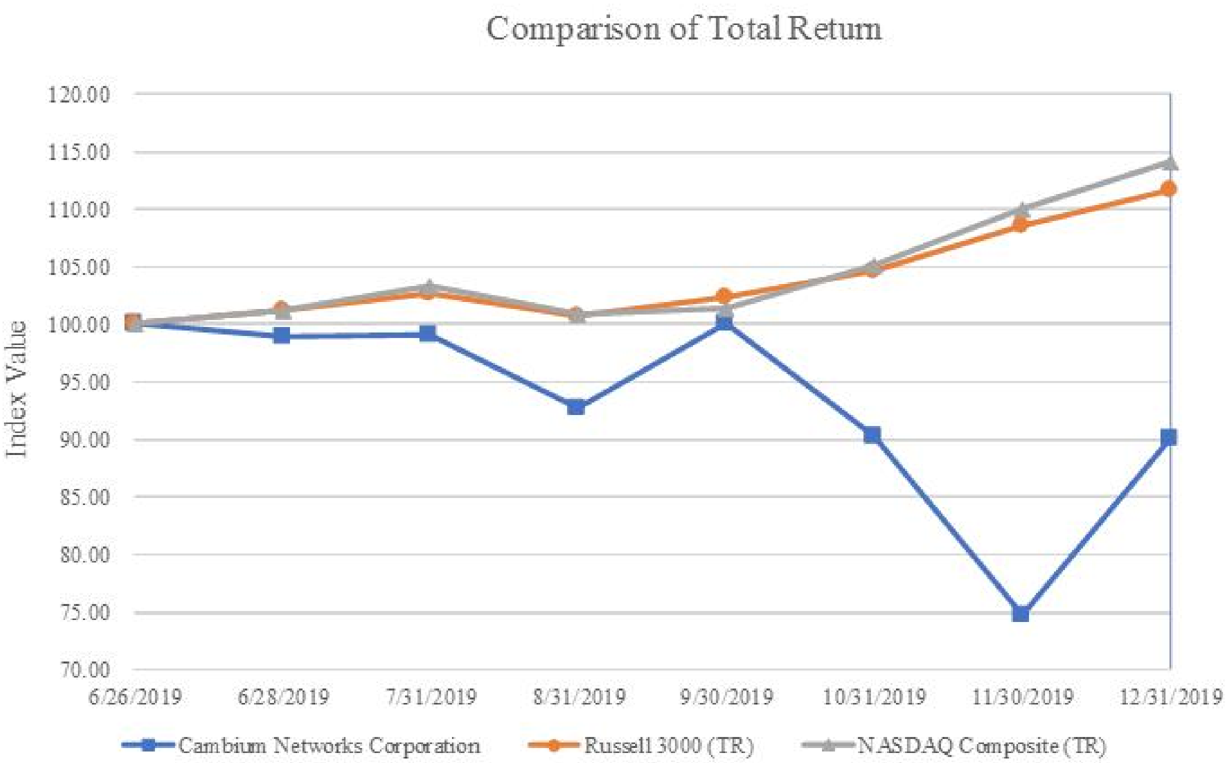
Equity compensation plan information

Information regarding the securities authorized for issuance under our equity compensation plans will be included in our Proxy Statement relating to our 2020 annual meeting of Stockholders to be filed with the SEC within 120 days after the end of our fiscal year ended December 31, 2019 and is incorporated herein by reference.

Performance graph

Notwithstanding any statement to the contrary in any of our filings with the SEC, the following information shall not be deemed "filed" with the SEC or "soliciting material" under the Securities Exchange Act of 1934 and shall not be incorporated by reference into any such filings irrespective of any general incorporation language contained in such filing.

The following graph compares the total cumulative stockholder return on our ordinary shares with the total cumulative return of the Russell 3000 Index and the NASDAQ Composite Index during the period commencing on June 26, 2019, the initial trading day of our ordinary shares, and ending on December 31, 2019. The graph assumes that $100 was invested at the beginning of the period in our ordinary shares and in each of the comparative indices, and the reinvestment of any dividends. Historical share price performance should not be relied upon as an indication of future share price performance.



	6/26/2019	6/28/2019	7/31/2019	8/31/2019	9/30/2019	10/31/2019	11/30/2019	12/31/2019
Cambium Networks Corporation	100.00	98.87	99.07	92.68	100.00	90.31	74.74	90.10
Russell 3000 (TR)	100.00	101.26	102.76	100.67	102.44	104.64	108.62	111.75
NASDAQ Composite (TR)	100.00	101.23	103.41	100.87	101.41	105.17	110.06	114.05

Item 6. Selected Financial Data.

Consolidated Selected Financial Data

The following selected consolidated financial data should be read together with our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K and the information in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations." Our fiscal year ends on December 31. The following selected financial data has been derived from our audited consolidated financial statements. Historical results are not necessarily indicative of future results.

	Year Ended December 31,		
	2017	2018	2019
Consolidated Statements of Operations Data:		(in thousands)	
Revenues	$ 216,671	$ 241,762	$ 267,028
Cost of revenues	105,960	126,267	135,799
Gross profit	110,711	115,495	131,229
Operating expenses			
Research and development	32,227	38,917	47,692
Sales and marketing	37,209	42,658	46,253
General and administrative	17,578	18,804	30,125
Depreciation and amortization	8,824	8,765	5,858
Total operating expenses	95,838	109,144	129,928
Operating income	14,873	6,351	1,301
Interest expense	5,018	8,113	8,076
Other expense	474	550	546
Income (loss) before income taxes	9,381	(2,312)	(7,321)
(Benefit) provision for income taxes	(418)	(799)	10,280
Net income (loss)	$ 9,799	$ (1,513)	$ (17,601)
Earnings (loss) per share			
Basic and diluted	$ 0.67	$ (0.11)	$ (0.89)
Weighted-average number of shares outstanding to compute net income (loss) per share			
Basic and diluted	13,600,411	13,600,411	19,741,764

	As of December 31,		
	2017	2018	2019
Consolidated Balance Sheet Data:		(in thousands)	
Cash	$ 7,377	$ 4,441	$ 19,346
Working capital (1)	30,986	39,274	61,449
Total assets	121,613	142,057	172,479
Total debt (2)	87,377	103,019	63,612
Total shareholders' (deficit) equity	(17,826)	(20,571)	39,929

(1) Working capital is defined as total current assets minus total current liabilities.

(2) Total debt is shown net of deferred financing fees of $2.6 million, $2.4 million and $1.6 million for 2017, 2018 and 2019, respectively.

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

The following discussion and analysis of financial condition and results of operations should be read in conjunction with the consolidated financial statements and related notes thereto of Cambium Networks Corporation ("Cambium", "we", "our", or "us") included elsewhere in this Annual Report on Form 10-K. The following discussion contains forward-looking statements that reflect our plans, estimates and beliefs. Our actual results could differ materiality from those discussed in the forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Annual Report on Form 10-K, particularly those discussed under Part I, Item 1A. "Risk Factors." Our historical results are not necessarily indicative of the results that may be expected for any period in the future.

Overview

We provide wireless broadband networking infrastructure solutions for network operators, including medium-sized wireless Internet service providers, enterprises, and government agencies. Our scalable, reliable and high-performance solutions create a purpose-built wireless fabric that connects people, places and things across distances ranging from two meters to more than 100 kilometers, indoors and outdoors, using licensed and unlicensed spectrum at attractive economics. Our embedded proprietary RF technology and software enables automated optimization of data flow at the outermost points in the network, which we refer to as the "Intelligent edge."

We were formed in 2011 when Cambium Networks acquired the PTP and PMP businesses from Motorola Solutions. Prior to the acquisition by Cambium Networks, Motorola Solutions had invested over a decade in developing the technology and intellectual property assets that formed the foundation for our business, having launched the Canopy PMP business in 1999 and having acquired the Orthogon Systems PTP business in 2006. Following the acquisition, we renamed the business Cambium Networks and leveraged the technology to continue to develop and offer an extensive portfolio of reliable, scalable and secure enterprise-grade fixed wireless broadband and PTP and PMP platforms, Wi-Fi and IIoT solutions.

We offer our wireless broadband solutions in three categories:

- PTP: Our PTP backhaul portfolio is comprised of products operating in unlicensed spectrum below 6 GHz, and those operating in licensed spectrum between 6 and 38 GHz. The mainstay of our backhaul offering is the PTP 670 for commercial applications and PTP 700 for defense and national security applications. In addition, our PTP 820 series offers carrier-grade microwave backhaul in licensed spectrum, and our recently introduced PTP 550 offers price-performance leadership in spectral efficiency in sub-6GHz unlicensed spectrum.
- PMP: Our PMP portfolio ranges from our top-of-the-line PMP 450 series to our ePMP solutions for network operators that need to optimize for both price and performance to our cnReach family of narrow-bandwidth connectivity products for industrial communications. The PMP 450 series is optimized for performance in high-density and demanding physical environments, and includes the PMP 450*m* with integrated *cn*Medusa massive multi-user multiple input/multiple output, or MU-MIMO, technology. For less demanding environments, ePMP provides a high-quality platform at a more affordable price. The recently released ePMP 3000 supports 4x4 MU-MIMO and is complemented by a broad portfolio of ePMP Force 300 subscriber radios. cnReach products enables IIoT applications, such as supervisory control and data acquisition, or SCADA, processes in the oil and gas, electric utility, water, railroad and other industrial settings.
- Wi-Fi: Our Wi-Fi portfolio includes our cnPilot cloud-managed Wi-Fi solutions, our cnMatrix cloud-managed wireless-aware switching solution, and our Xirrus Wi-Fi solutions. cnPilot is for indoor and outdoor enterprise, small business and home applications and offers a range of access points and RF technology that enable network optimization based on desired geographic coverage and user density. cnMatrix provides the intelligent interface between wireless and wired networks. cnMatrix's policy-based configuration accelerates network deployment, mitigates human error, increases security, and improves reliability. Xirrus has a portfolio of high performance enterprise Wi-Fi access points and cloud based subscription services.

We generate a substantial majority of our sales through our global channel distribution network, including, as of December 31, 2019, approximately 150 distributors that we sell to directly, together with over 6,800 value added resellers and system integrators supplied by these distributors. Our channel partners provide lead generation, pre-sales support and product fulfillment, along with professional services for network design, installation, commissioning and on-going field support. Although we fulfill sales almost exclusively through our channel partners, through our global sales team we engage directly with network operators in our key vertical markets including service providers, enterprises, industrials, defense and national security, and state and local governments. Our sales team responds to bids or requests for quotes, typically in collaboration with a channel partner. Our distributors carry inventory of our products for resale, and generally have stock rotation rights only if they simultaneously place an off-setting order for product. As such, we generally recognize revenue from sales to distributors on a sell-in basis, and manage our finished goods inventory efficiently to plan for distributor demand.

We outsource production to third-party manufacturers, which are responsible for purchasing and maintaining inventory of components and raw materials and, in certain cases, we resell third-party products on a white-label basis. We believe that this approach gives us the advantages of relatively low capital investment and significant flexibility in scheduling production, managing inventory levels and providing a comprehensive solution to meet network operator demand. The majority of our products are delivered to us at one of three distribution hubs, where we have outsourced the warehousing and delivery of our products to a third-party logistics provider and from which we manage worldwide fulfillment.

Initial public offering

Our registration statement filed with the Securities and Exchange Commission in connection with our initial public offering, or IPO, was declared effective on June 25, 2019, and our ordinary shares began trading on the Nasdaq Global Market on June 26, 2019. On June 28, 2019, we completed our IPO, in which we sold 5,800,000 shares at a public offering price of $12.00 per share, of which 1,500,000 shares were purchased by our majority shareholder, VCH, L.P. On June 28, 2019, we received net proceeds of $66.0 million after deducting underwriting discounts and commissions of $3.6 million. The net proceeds from the IPO were used to pay down $30.7 million of our debt, $4.6 million of deferred offering costs, $5.6 million to Vector Capital Management, and $4.7 million to Riverbed Technology, Inc. for the Xirrus acquisition.

Our consolidated financial statements for the year ended December 31, 2019 reflect share-based compensation expense of $16.1 million associated with the one-time recognition of deferred share-based compensation expense and the the one-time issuance of 2,172,000 share options and restricted share units, each upon the completion of our IPO.

Xirrus acquisition

In August 2019, we acquired select assets and assumed select liabilities of the Xirrus Wi-Fi products and cloud services business from Riverbed Technology, Inc. Xirrus has a portfolio of high performance enterprise Wi-Fi access points and subscription services. We paid $2.0 million upon closing and the agreement provided for additional $3.0 million subject to Xirrus attaining certain booking targets. As of December 31, 2019, all booking targets have been meet. We paid the full $3.0 million of remaining consideration through February 2020. This acquisition will enhance and accelerate our existing network service application capabilities.

We account for business combinations in accordance with ASC 805, *Business Combinations*. We recorded the acquisition using the acquisition method of accounting and recognized assets and liabilities at their fair value as of the date of acquisition. We based the preliminary allocation of the puchase price on estimates and assumptions that are subject to change within the purchase price allocation period, which is generally one year from the acquisition date. The purchase accounting is not yet complete and as such the final allocation may be subject to change. We determined the estimated fair value of identifiable intangible assets acquired primarily using an income approach.

Basis of presentation

Revenues

Our revenues are generated primarily from the sale of our products, which consist of hardware with essential embedded software. Our revenues also include limited amounts for software products and extended warranty on hardware products. We generally recognize product revenues at the time of shipment, provided that all other revenue recognition criteria have been met. Revenues are recognized net of estimated stock returns, volume-based rebates and cooperative marketing allowances that we provide to distributors. We provide a standard one-year or three-year warranty on our hardware products, that includes access to telephone and internet support. In addition, we offer extended warranties on certain hardware products. We recognize revenues on extended warranties on a straight-line basis over the contractual period. We provide our cnMaestro, LINKPlanner and cnArcher applications as supplemental tools to help network operators design, install, and manage their networks, and as a means of driving sales of our hardware products. We presently offer these applications without additional charge to the customer and these applications are not essential to the operation of our products.

Cost of revenues and gross profit

Our cost of revenues is comprised primarily of the costs of procuring finished goods from our third-party manufacturers, third-party logistics and warehousing provider costs, freight costs and warranty costs. We outsource our manufacturing to third-party manufacturers located primarily in Mexico, China and Israel. Cost of revenues also includes costs associated with supply operations, including personnel related costs, provision for excess and obsolete inventory, third-party license costs and third-party costs related to services we provide. Beginning in the fourth quarter of 2017, cost of revenues includes amortization of capitalized internal costs for software to be sold or marketed externally.

Gross profit has been and will continue to be affected by various factors, including changes in product mix. The margin profile of products within each of our core product categories can vary significantly depending on the operating performance, features and manufacturer of the product. Generally, our gross margins on backhaul and access point products are greater than those on our CPE products. Because the ratio of CPE to PTP and PMP access points typically increases as network operators build out the density of their networks, increases in follow-on sales to network operators as a percentage of our total sales typically have a downward effect on our overall gross margins. Finally, gross margin will also vary as a function of changes in pricing due to competitive pressure, our third-party manufacturing and other production costs, cost of shipping and logistics, provision for excess and obsolete inventory and other factors. We expect our gross margins will fluctuate from period to period depending on the interplay of these various factors.

Operating expenses

We classify our operating expense as research and development, sales and marketing, and general and administrative expense. Personnel costs are the primary component of each of these operating expense categories, which consist of cash-based personnel costs, such as salaries, sales commissions, benefits and bonuses. From and after our IPO, operating expenses also include share-based compensation expense. In addition, we separate depreciation and amortization in their own category.

Research and development

In addition to personnel-related costs, research and development expense consists of costs associated with design and development of our products, product certification, travel and recruiting. We generally recognize research and development expense as incurred. For certain of our software projects under development, we capitalize the development cost during the period between determining technological feasibility of the product and commercial release. We amortize the capitalized development cost upon commercial release, generally over three years. We typically do not capitalize costs related to the development of first-generation product offerings as technological feasibility generally coincides with general availability of the software. We expect research and development expense to increase in absolute dollars as we continue to invest in our future products and services.

Sales and marketing

In addition to personnel costs for sales, marketing, service and product line management personnel, sales and marketing expense consists of our training programs, trade shows, marketing programs, promotional materials, demonstration equipment, national and local regulatory approval on our products, travel and entertainment, and recruiting. We expect sales and marketing expense to continue to increase in absolute dollars as we increase the size of our sales, marketing, service, and product line management organization in support of our investment in our growth opportunities, and, in particular, as we continue to expand our global distribution network.

General and administrative

In addition to personnel costs, general and administrative expense consists of professional fees, such as legal, audit, accounting, information technology and consulting costs, facilities and other supporting overhead costs, as well as loan transaction fees and management fees paid to Vector Capital. We expect general and administrative expense to increase in absolute dollars as we continue to incur additional costs associated with being a public company, partially offset by the absence of financing and management fees previously paid to Vector Capital.

Depreciation and amortization

Depreciation and amortization expense consist of depreciation related to fixed assets such as computer equipment, furniture and fixtures, and testing equipment, as well as amortization related to acquired and internal use software and definite lived intangibles.

Provision for income taxes

Our provision for income taxes consists primarily of income taxes in the jurisdictions in which we conduct business. As we have expanded our international operations, we have incurred additional foreign tax expense, and we expect this to continue. Management assesses our deferred tax assets in each reporting period, and if it is determined that it is not more likely than not to be realized, we will record a change in our valuation allowance in that period.

Results of operations

The following table presents the consolidated statements of operations, as well as the percentage relationship to total revenues for items included in our consolidated statements of operations:

(in thousands)	2017	2018	2019
Statements of Operations Data:			
Revenues	$ 216,671	$ 241,762	$ 267,028
Cost of revenues	105,960	126,267	135,799
Gross profit	110,711	115,495	131,229
Operating expenses			
Research and development	32,227	38,917	47,692
Sales and marketing	37,209	42,658	46,253
General and administrative	17,578	18,804	30,125
Depreciation and amortization	8,824	8,765	5,858
Total operating expenses	95,838	109,144	129,928
Operating income	14,873	6,351	1,301
Interest expense	5,018	8,113	8,076
Other expense	474	550	546
Income (loss) before income taxes	9,381	(2,312)	(7,321)
(Benefit) provision for income taxes	(418)	(799)	10,280
Net income (loss)	**$ 9,799**	**$ (1,513)**	**$ (17,601)**

	2017	2018	2019
Percentage of Revenues:			
Revenues	100.0%	100.0%	100.0%
Cost of revenues	48.9%	52.2%	50.9%
Gross margin	51.1%	47.8%	49.1%
Operating expenses			
Research and development	14.9%	16.1%	17.9%
Sales and marketing	17.2%	17.6%	17.3%
General and administrative	8.1%	7.8%	11.3%
Depreciation and amortization	4.1%	3.6%	2.2%
Total operating expenses	44.3%	45.1%	48.7%
Operating income	6.8%	2.7%	0.4%
Interest expense	2.3%	3.4%	3.0%
Other expense	0.2%	0.2%	0.2%
Income (loss) before income taxes	4.3%	(0.9)%	(2.8)%
(Benefit) provision for income taxes	(0.2)%	(0.3)%	3.8%
Net income (loss)	4.5%	(0.6)%	(6.6)%

Comparison of the year ended December 31, 2018 to the year ended December 31, 2019

Revenues

			Change	
(dollars in thousands)	2018	2019	$	%
Revenues	$ 241,762	$ 267,028	$ 25,266	10.5%

Revenues increased $25.3 million, or 10.5%, from $241.8 million in 2018 to $267.0 in 2019, which was attributable to growth in our point-to-multipoint and Wi-Fi lines, including newer products, as well as pricing actions taken in February 2019. Complementing increased product demand, as described below, revenue growth in 2019 also benefitted from continued expansion of our channel, bringing the total registered channel partners to over 6,800 as of December 31, 2019.

Revenues by product category

(dollars in thousands)	2018	2019	Change $	Change %
Point-to-MultiPoint	$ 146,621	$ 156,157	$ 9,536	6.5%
Point-to-Point	71,678	71,618	(60)	(0.1)%
Wi-Fi	19,571	35,678	16,107	82.3%
Other	3,892	3,575	(317)	(8.1)%
Total revenues by product category	$ 241,762	$ 267,028	$ 25,266	10.5%

Point-to-MultiPoint

Our PMP products comprised 61% of total revenues for 2018 and 58% of total revenues for 2019. PMP revenue growth was attributable to continued growth in core PMP products and new product introduction.

Point-to-Point

PTP revenue was essentially flat due to funding delays in the defense sector.

Wi-Fi

Wi-Fi revenue increased primarily as a result of recent new product introductions, including cnMatrix as well as sales of Xirrus products and services which was acquired in the current year.

Revenues by geography

(dollars in thousands)	2018	2019	Change $	Change %
North America	$ 108,884	$ 122,565	$ 13,681	12.6%
Europe, Middle East, Africa	75,503	85,930	10,427	13.8%
Caribbean and Latin America	29,833	31,767	1,934	6.5%
Asia Pacific	27,542	26,766	(776)	(2.8)%
Total revenues by geography	$ 241,762	$ 267,028	$ 25,266	10.5%

Revenues increased in all but one region with North America and Europe, Middle East, Africa contributing 76% and 78% of total revenues for 2018 and 2019, respectively. North America sales benefited from new product introductions of PMP products, but were affected by decreased sales to the defense industry due to funding timing. Europe, Middle East, Africa sales increased due to increased sales to the enterprise sector as well as increased sales of ePMP and wireless products. Caribbean and Latin America sales increased due to increased sales of wireless products to enterprise customers while Asia Pacific sales were lower due to government sector spending delays in the Wi-Fi category.

Cost of revenues and gross margin

(dollars in thousands)	2018	2019	Change $	Change %
Cost of revenues	$ 126,267	$ 135,799	$ 9,532	7.5%
Gross margin	47.8%	49.1%		130 bps

Cost of revenues increased $9.5 million, or 7.5%, from $126.3 million for 2018 to $135.8 million for 2019. The increase in cost of revenues was primarily due to increased product and freight costs as a result of increased sales.

Gross margin increased from 47.8% in 2018 to 49.1% in 2019. The increase was driven by higher volumes, improved product and geographical mix, and key initiatives put in place focused on price management, cost reductions, and supply chain efficiencies.

Operating expenses

(dollars in thousands)	2018	2019	Change $	Change %
Research and development	$ 38,917	$ 47,692	$ 8,775	22.5%
Sales and marketing	42,658	46,253	3,595	8.4%
General and administrative	18,804	30,125	11,321	60.2%
Depreciation and amortization	8,765	5,858	(2,907)	(33.2)%
Total operating expenses	$ 109,144	$ 129,928	$ 20,784	19.0%

Research and development

Research and development expense increased $8.8 million, or 22.5%, from $38.9 million in 2018 to $47.7 million in 2019. As a percentage of revenues, research and development expenses increased from 16.1% in 2018 to 17.9% in 2019. Research and development expense increased due to $5.4 million of share-based compensation expense as well as a $3.6 million increase in headcount costs primarily related to additional headcount added as part of our Xirrus acquisition and our continued investment in product development to grow our business. As a percentage of revenues, the increases in research and development expense related to headcount investment and share-based compensation expense outpaced revenue growth.

Sales and marketing

Sales and marketing expense increased $3.6 million, or 8.4%, from $42.7 million in 2018 to $46.3 million in 2019. As a percentage of revenues, sales and marketing expense decreased from 17.6% in 2018 to 17.3% in 2019. Sales and marketing expense increased due to $4.2 million of share-based compensation expense offset by $0.8 million of lower variable pay from employee incentive plans. As a percentage of revenues, the decrease was largely due to our efforts to control spending in line with revenue growth.

General and administrative

General and administrative expense increased $11.3 million, or 60.2%, from $18.8 million in 2018 to $30.1 million in 2019. As a percentage of revenues, general and administrative expense increased from 7.8% in 2018 to 11.3% in 2019. The increase in general and administrative expense consisted of $7.9 million of share-based compensation expense, $1.5 million of directors and officers insurance premiums as well as higher facility and technology costs of $1.0 million and accounting and tax fees of $0.5 million. As a percentage of revenues, general and administrative expense was higher largely as a result of share-based compensation expense and directors and officers insurance premiums as a result of transitioning to a public company.

Depreciation and amortization

Depreciation and amortization expense decreased $2.9 million, or (33.2)%, from $8.8 million in 2018 to $5.9 million in 2019. The decrease in depreciation and amortization was driven by decreases in intangible asset amortization, as certain acquired software, technology and patents became fully amortized during the fourth quarter of 2018, offset by an increase in amortization due to new intangibles being recognized as a result of the Xirrus acquisition.

Interest expense

(dollars in thousands)	2018	2019	Change $	Change %
Interest expense	$ 8,113	$ 8,076	$ (37)	(0.5)%

Interest expense remained relatively flat from 2018 to 2019. This was primarily due to a $0.5 million write-down of deferred financing fees in July 2019 related to the prepayment on the term loan offset by $0.5 million in lower interest expense as a result of the lower debt balance.

Other expense

(dollars in thousands)	2018	2019	Change $	Change %
Other expense	$ 550	$ 546	$ (4)	(0.7)%

Other expense remained relatively flat from 2018 to 2019, and was primarily associated with foreign currency fluctuations.

(Benefit) provision for income taxes

(dollars in thousands)	2018	2019	Change $	Change %
(Benefit) provision for income taxes	$ (799)	$ 10,280	$ 11,079	nm
Effective income tax rate	34.6%	(140.4)%		

Our income tax expense increased $11.1 million from a benefit of $0.8 million for the year ended December 31, 2018 to a provision of $10.3 million for the year ended December 31, 2019. The effective tax rates were 34.6% and (140.4)% for the years ended 2018 and 2019, respectively. Tax expense was higher in 2019 due to an establishment of a valuation allowance against our deferred tax assets recognized during 2019 of $9.6 million, as well as taxation of pre-IPO Management Incentive Unit ("MIU") equity awards of $2.8 million, partially offset by tax benefits on research and development of $1.3 million and foreign derived intangible income of $1.2 million in the year ended December 31, 2019 versus a tax benefit on a pre-tax operating loss of $2.3 million recognized in the year ended December 31, 2018.

Comparison of the year ended December 31, 2017 to the year ended December 31, 2018

Revenues

(dollars in thousands)	2017	2018	Change $	Change %
Revenues	$ 216,671	$ 241,762	$ 25,091	11.6%

Revenues increased $25.1 million, or 11.6%, from $216.7 million in 2017 to $241.8 million in 2018, which was attributable to growth in all of our core products. Complementing increased product demand, as described below, revenue growth in 2018 benefitted from continued expansion of our channel, bringing the total registered channel partners to over 5,300 as of December 31, 2018.

Revenues by product category

(dollars in thousands)	2017	2018	Change $	Change %
Point-to-MultiPoint	$ 142,000	$ 146,621	$ 4,621	3.3%
Point-to-Point	56,130	71,678	15,548	27.7%
Wi-Fi	14,620	19,571	4,951	33.9%
Other	3,921	3,892	(29)	(0.7)%
Total revenues by product category	$ 216,671	$ 241,762	$ 25,091	11.6%

Point-to-MultiPoint

Our PMP products comprised 66% of total revenues for 2017 and 61% of total revenues for 2018. PMP revenue growth was attributable to continued growth in core PMP products and new product introductions including 3 GHz and ePMP 3000.

Point-to-Point

The increase in our PTP revenue was driven principally by strong sales of new products, primarily for the defense industry.

Wi-Fi

Wi-Fi revenue increased primarily as a result of continued adoption of core wireless products across international regions as discussed further in "-Revenues by geography" below.

Revenues by geography

(dollars in thousands)	2017	2018	Change $	Change %
North America	$ 100,676	$ 108,884	$ 8,208	8.2%
Europe, Middle East, Africa	68,208	75,503	7,295	10.7%
Caribbean and Latin America	26,962	29,833	2,871	10.6%
Asia Pacific	20,825	27,542	6,717	32.3%
Total revenues by geography	$ 216,671	$ 241,762	$ 25,091	11.6%

Revenues increased in all regions over the period, with North America and EMEA contributing 78% of total revenues for 2017 and 76% of total revenues for 2018. North America sales benefited from new product introductions, specifically for the defense industry. Europe, Middle East, Africa sales increased due to increasing momentum of product adoption of indoor Wi-Fi products and expansion into new geographies including North Africa and Saudi Arabia. Caribbean and Latin America sales increased due to infrastructure replacement initiatives, and sales of 3 GHz PMP products. Asia Pacific benefited from substantial sales growth in India, which was driven by a government sponsored initiative to increase rural internet connectivity and general growth in the wireless internet service provider industry.

Cost of revenues and gross margin

(dollars in thousands)	2017	2018	Change $	Change %
Cost of revenues	$ 105,960	$ 126,267	$ 20,307	19.2%
Gross margin	51.1%	47.8%		(330) bps

Cost of revenues increased $20.3 million, or 19.2%, from $106.0 million in 2017 to $126.3 million in 2018. The increase in cost of revenues was primarily due to increased product sales, changes in product mix, freight costs, and increases in excess and obsolescence reserves.

Gross margin decreased from 51.1% in 2017 to 47.8% in 2018. The decrease in gross margin reflected competitive pricing impacts from larger customers as we expanded into new countries such as India as well as new product delays in the second half of 2018, which affected both mix and freight costs as shipments were delayed toward the end of the quarters. Margins were also negatively impacted by the absence of a favorable adjustment to excess and obsolescence reserves in 2017 that did not repeat in 2018.

Operating expenses

(dollars in thousands)	2017	2018	Change $	Change %
Research and development	$ 32,227	$ 38,917	$ 6,690	20.8%
Sales and marketing	37,209	42,658	5,449	14.6%
General and administrative	17,578	18,804	1,226	7.0%
Depreciation and amortization	8,824	8,765	(59)	(0.7)%
Total operating expenses	$ 95,838	$ 109,144	$ 13,306	13.9%

Research and development

Research and development expense increased $6.7 million, or 20.8%, from $32.2 million in 2017 to $38.9 million in 2018. As a percentage of revenues, research and development expense increased from 14.9% in 2017 to 16.1% in 2018. The increase in research and development expense, both in absolute dollars and as a percentage of revenues, was due to our continued investment in product development to grow our business, including a $3.9 million increase in headcount and personnel costs and a $2.0 million increase in materials and regulatory testing in our design and development activities.

Sales and marketing

Sales and marketing expense increased $5.5 million, or 14.6%, from $37.2 million in 2017 to $42.7 million in 2018. As a percentage of revenues, sales and marketing expense increased from 17.2% in 2017 to 17.6% in 2018. Sales and marketing expense increased, both in absolute dollars and as a percentage of revenues, largely due to our continued investment in growing our sales to drive growth in new geographies and in mid-market customers, marketing and product line management infrastructures, including a

$3.8 million increase in sales and marketing headcount and personnel costs, and a $1.0 million increase in other costs, primarily marketing and promotions-related spending.

General and administrative

General and administrative expense increased $1.2 million, or 7.0%, from $17.6 million in 2017 to $18.8 million in 2018. As a percentage of revenues, general and administrative expense decreased from 8.1% in 2017 to 7.8% in 2018. General and administrative expense increased in absolute dollars largely due to a $2.3 million increase in headcount costs, primarily personnel in administration and finance, and a $0.7 million increase in facilities costs, partially offset by the non-recurrence of the $1.0 million in loan transaction fees recognized in 2017 to an affiliate of Vector Capital related to our refinancing of our secured credit facility. Absent the loan transaction fee, general and administrative expense increased as a percentage of revenues from 7.2% in 2017 to 7.8% in 2018.

Depreciation and amortization

Depreciation and amortization expense was $8.8 million in both 2017 and 2018.

Interest expense

(dollars in thousands)	2017	2018	Change $	Change %
Interest expense	$ 5,018	$ 8,113	$ 3,095	61.7%

Interest expense increased $3.1 million, or 61.7%, from $5.0 million in 2017 to $8.1 million for 2018. The increase was primarily due to refinancing of our bank loans and settlement of related party financial instruments in July 2017 and December 2017, whereby certain related party debt was converted to contributed capital in July 2017 and subsequently returned to such related party in cash through increased borrowings in December 2017. See Note 7 - Debt, Note 8 - Loan from Sponsor and capital contribution, and Note 19 - Related party transactions in the Notes to Consolidated Financial Statements for further information.

Other expense

(dollars in thousands)	2017	2018	Change $	Change %
Other expense	$ 474	$ 550	$ 76	16.0%

Other expense increased $0.1 million from $0.5 million in 2017 to $0.6 million for 2018, which was primarily associated with foreign currency fluctuations.

Benefit for income taxes

(dollars in thousands)	2017	2018	Change $
Benefit for income taxes	$ (418)	$ (799)	$ (381)
Effective income tax rate	(4.5)%	34.6%	

Our tax benefit increased from $0.4 million in 2017 to $0.8 million for 2018. The effective tax rates for the years ended December 31, 2017 and 2018 were (4.5)% and 34.6%, respectively. For the year ended December 31, 2017, our income tax expense was reduced by a $6.4 million decrease in our valuation allowance primarily related to net operating loss carryforwards and research and development credits partially offset by a $3.1 million decrease in deferred tax assets related to interest expense. Excluding these two items, we had an income tax expense of $2.9 million for the year ended December 31, 2017, on pre-tax income of $9.4 million representing an effective tax rate of 30.9% compared with a pre-tax loss of $(2.3) million for the year ended December 31, 2018. See Note 14 - Income taxes in the Notes to the Consolidated Financial Statements for more information related to income taxes.

Liquidity and Capital Resources

As of December 31, 2019, we had a cash balance of $19.3 million. Our primary liquidity needs are: (i) to fund normal operating expenses; (ii) to meet interest and principal requirements of our outstanding indebtedness; and (iii) to fund capital expenditures. We believe these needs will be satisfied over at least the next 12 months using cash flow generated by our operations, our cash proceeds from our IPO, and our available borrowings under our revolving credit facility. Our future capital requirements may vary materially from those currently planned and will depend on many factors, including our rate of revenue growth, the timing and extent of spending to support development efforts, the timing of new product introductions, market acceptance of our products and overall economic conditions. We expect to regularly assess market conditions and may raise additional equity or incur additional debt if and when our board of directors determines that doing so is in our best interest.

On June 28, 2019, we received net proceeds of $66.0 million upon the completion of our IPO, after deducting underwriting commission and fees. We used $30.7 million of the net proceeds to pay down our external debt, $5.6 million to pay management fees owed to Vector Capital, $4.6 million to pay deferred offering costs in conjunction with the offering, and $4.7 million to pay for the initial purchase price and contingent consideration related to our acquisition of the Xirrus Wi-Fi business.

Cash Flows

The following table sets forth summarized cash flow data for the periods indicated (in thousands):

	Years Ended December 31, 2017	2018	2019
Cash provided by (used in) operating activities	$ 23,001	$ (10,395)	$ 3,553
Cash used in investing activities	$ (5,931)	$ (7,500)	$ (8,612)
Cash (used in) provided by financing activities	$ (24,347)	$ 15,066	$ 20,002

Cash flows from operating activities

Net cash provided by operating activities in 2017 of $23.0 million consisted primarily of net income of $9.8 million, adjustments for depreciation and amortization of $8.9 million and changes in operating assets and liabilities that resulted in net cash inflows of $5.8 million. The changes in operating assets and liabilities consisted primarily of a $4.7 million increase in accounts payable mostly due to increased payment terms and increased volumes with suppliers, a $5.1 million increase in accrued interest and payables to Vector Capital, a $3.0 million increase in accrued employee compensation expense due to increased headcount and accrued bonuses and commissions, partially offset by $10.7 million increase in net accounts receivable due to increased sales.

Net cash used in operating activities for 2018 of $10.4 million consisted primarily of a net loss of $1.5 million, adjustments for depreciation and amortization of $9.6 million and changes in operating assets and liabilities that resulted in net cash outflows of $17.6 million. The changes in operating assets and liabilities consisted primarily of a $10.0 million increase in inventories as we procured inventory of new products introduced toward the end of the year and a $7.4 million increase in accounts receivable due to increased sales and a $4.1 million decrease in accrued employee compensation partially offset by a $4.3 million increase in accounts payable.

Net cash provided by operating activities for 2019 of $3.6 million consisted primarily of a net loss of $17.6 million, adjustments for share-based compensation expense of $17.7 million, depreciation and amortization of $7.5 million and changes in deferred tax assets of $7.4 million along with changes in operating assets and liabilities that resulted in net cash outflows of $11.8 million. The changes in operating assets and liabilities consisted primarily of a $7.6 million increase in inventories as we procured additional inventory of new products in anticipation of increased sales, reduced accounts payable of $2.1 million and reduced accrued payables to Vector Capital of $5.5 million as we paid the accrued Vector Capital management fees following the IPO in June 2019.

Cash flows from investing activities

Our investing activities for all periods presented consisted of capital expenditures for property, equipment and software in support of the growth of our business. Our investing activities in 2019 also included $2.0 million of cash paid for the acquisition of select assets and assumption of select liabilities of the Xirrus Wi-Fi business and a $2.7 million contingent consideration paid in November 2019 related to the acquisition.

Cash flows from financing activities

We used $24.3 million of cash for financing activities during 2017. During 2017, we received $120.0 million in cash from our lenders under the two debt refinancing transactions described below in “-Secured credit agreement”, paid $66.5 million in debt repayments to our lender, returned capital to and redeemed preference shares from Vector Capital for an aggregate of $75.0 million and incurred $2.8 million in debt financing costs.

Net cash provided by financing activities of $15.1 million for 2018 was primarily due to $10.0 million in proceeds received from borrowing under our revolving credit facility, $10.0 million in proceeds received from our term loan, partially offset by $4.5 million of scheduled principal payments due under our term loan facility and $0.4 million of new debt issuance costs paid for the December 2017 refinancing.

Net cash provided by financing activities of $20.0 million for 2019 was primarily due to $66.0 million in proceeds received from the issuance of shares in our IPO, net of underwriters commissions, paid down $30.7 million in principal under our term loan and revolving loan facilities, payment of $9.5 million in scheduled principal payments due under our term loan facility, and payment of $4.6 million of deferred issuance costs related to the IPO.

Debt

We had outstanding external debt on our term loan of $95.5 million and $65.3 million, including the current portions of $9.5 million and $10.0 million at December 31, 2018 and 2019, respectively. We had outstanding external debt on our revolving credit facility of $10.0 million and $0.0 million at December 31, 2018 and 2019, respectively.

On June 28, 2019, we entered into a Third Amendment to Amended and Restated Credit Agreement (the "Third Amendment"). The Third Amendment amends the Amended and Restated Credit Agreement, dated December 21, 2017, as amended by that Waiver and First Amendment to Amended and Restated Credit Agreement dates as of November 21, 2018 and as further amended by the Consent, Waiver and Second Amendment to Amended and Restated Credit Agreement dated as of April 26, 2019 (as amended, amended and restated, supplemented, restructured or otherwise modified, renewed or replaced from time to time, the "Credit Agreement").

Pursuant to the Third Amendment, certain actions taken by us in connection with our June 2019 IPO were consented to by Silicon Valley Bank and the Lenders, including (i) the exchange of outstanding vested and unvested Class B units and phantom units in VCH L.P. for ordinary shares in us (in exchange for vested units) and restricted stock awards (for unvested Class B units) and restricted stock units (for unvested phantom units) and the adoption of the employee share incentive plan and employee share purchase plan and forms of award agreement thereunder by us; (ii) the payment of accrued and unpaid management fees owed to an affiliate of VCH, L.P.; and (iii) the entering into of the Shareholder Agreement by and between VCH, L.P. as a guarantor and loan party and terminated the guaranty granted by an affiliate of VCH, L.P. In addition, the prior two tranches under the loan were combined, with only one tranche of term loan remaining. The minimum consolidated fixed charge coverage ratio for the trailing twelve-month period ending December 31, 2019 and each trailing twelve-month quarterly period ending thereafter was amended to 1.25:1.00. All other financial covenants remained the same.

On July 1, 2019, we repaid $30.7 million to the Lenders out of the net proceeds of our IPO, comprised of $20.7 million repayment of the term loan and repayment of all outstanding amounts under the revolving credit facility, leaving an available revolving commitment of $10.0 million.

The Credit Agreement contains customary representations, warranties and affirmative and negative covenants. We are required to maintain quarterly minimum consolidated fixed charge coverage ratio and minimum consolidated leverage ratio, and a monthly minimum adjusted quick ratio. As of December 31, 2018, we were in compliance with all affirmative covenants and our monthly negative covenant, but were in default of both the quarterly maximum consolidated leverage ratio and the minimum consolidated fixed charge coverage ratio. On April 26, 2019, we entered into a Consent, Waiver and Second Amendment to Amended and Restated Credit Agreement, under which the Lenders waived the December 31, 2018 default, as well as reset certain of the debt covenants. We failed to comply with the minimum adjusted quick ratio for the month ended May 31, 2019. As a result, on June 21, 2019, our lenders provided a Waiver Agreement which waived our failure to meet this financial covenant. As of December 31, 2019, we were in compliance with all affirmative and negative covenants.

Contractual Obligations and Commercial Commitments

We lease office space and equipment under operating leases that run through 2026. Additionally, we entered into the Credit Agreement that matures in 2022.

Contractual obligations as of December 31, 2019 are as follows (in thousands):

	Payments due by period				
	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years	Total
Operating lease obligations	$ 2,781	$ 3,881	$ 1,859	$ 468	$ 8,989
Term credit facility (1)	10,000	55,250	—	—	65,250
Term credit facility interest (1)	3,960	5,977	—	—	9,937
Purchase obligations	32,724	—	—	—	32,724
Total	$ 49,465	$ 65,108	$ 1,859	$ 468	$ 116,900

(1) Based upon the Credit Agreement debt outstanding and interest rate in effect on December 31, 2019, of 6.85%.

Off-balance sheet arrangements

We do not engage in transactions that generate relationships with unconsolidated entities or financial partnerships, such as entities often referred to as variable interest entities, structured finance, or special purpose entities, as part of our ongoing business. Accordingly, our operating results, financial condition and cash flows are not subject to off-balance sheet risks.

Recent accounting pronouncements

We have reviewed all recently issued accounting standards and have disclosed in Note 1 in this Annual Report on Form 10-K the results of our review and assessment of the impact of each of the standards on our consolidated financial statements.

Critical accounting policies and estimates

Our consolidated financial statements are prepared in accordance with U.S. GAAP. The preparation of these financial statements requires our management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, costs and expense and related disclosures. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these judgments and estimates under different assumptions or conditions and any such differences may be material. We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates. For a summary of all of our accounting policies, including the accounting policies discussed below, see Note 1, *Description of Business and Summary of Significant Accounting Policies*, in the Notes to Consolidated Financial Statements.

Recognition of revenues

Our revenues are generated primarily from the sale of hardware products, with essential embedded software. Our revenues also include limited amounts for software products and extended warranty on hardware products. We account for revenues under Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers* ("ASC 606"), which we adopted on January 1, 2018. Revenue is recognized upon transfer of control of promised products to customers in an amount that reflects the consideration we expect to receive in exchange for those products. We determine the appropriate revenue recognition for our contracts with customers by analyzing the type, terms and conditions of each contract or arrangement. Certain of our contracts have multiple performance obligations for which we allocate the transaction price to each performance obligation based on the standalone selling price of each distinct product or service in the contract. The standalone selling price is the price at which we expect to be entitled to in exchange for transferring the promised good or service to the customer. The best evidence of standalone selling price is the observable price of a product or service when the Company sells that product or service separately in similar circumstances and to similar customers. In certain cases, the standalone sales price is not directly observable, and we estimate the transaction price allocated to each performance obligation using the expected cost plus margin approach. When, or as, a performance obligation is satisfied, we recognize as revenue the amount of the transaction price that is allocated to that performance obligation. The transaction price recognized excludes an estimate for the consideration related to products we expect to be returned or amounts we expect to refund.

Inventoryandinventory valuation

Inventories are stated at the lower of cost and net realizable value. In determining the cost of raw materials, consumables and goods purchased for resale, the weighted average purchase price is used. For finished goods, cost is computed as production cost including capitalized inbound freight costs.

The valuation of inventory requires us to estimate excess or obsolete inventory. The determination of excess or obsolete inventory is estimated based on a comparison of the quantity and cost of inventory on hand to our forecast of customer demand. The actual amount of inventory written off in future periods will likely differ from the inventory excess and obsolete provisions reflected in our consolidated balance sheets due to difference between estimated and actual future demand, which could have a material effect on our net inventory as reported in our consolidated financial statements. Any adjustments to the valuation of inventory are included in cost of revenues.

Product warranties

We provide a standard one-year or three-year warranty on most hardware products and record a liability for the estimated future costs associated with potential warranty claims at the time products are sold. Our responsibility under our standard warranty is the repair or replacement of in-warranty defective product, or to credit the purchase price of the defective product, at our discretions, without charge to the customer. Provisions for warranty claims are based on historical experience factors, including product failure rates, material usage, and service delivery cost incurred in correcting product failures. These provisions are reviewed and adjusted by management periodically to reflect actual and anticipated experience. The warranty costs are reflected in our consolidated statements of income within cost of revenues. In certain circumstances, we may have recourse from our contract manufacturers for replacement cost of defective products, which we also factor into our warranty liability assessment.

Income taxes

We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in our consolidated financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statement carrying amount and the tax bases of assets and liabilities using enacted income tax rates in effect for the year in which the differences are expected to be recovered or settled. The effect of a change in income tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

We recognize deferred tax assets to the extent that we believe these assets are more likely than not to be realized. In making such a determination, we consider all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If we determine that we would be able to realize our deferred tax asset in the future in excess of their net recorded amount, we would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes.

We may be subject to income tax audits in all the jurisdictions in which we operate and, as a result, we must also assess exposures to any potential issues arising from current or future audits of current and prior years' tax returns. Accordingly, we must assess such potential exposures and, where necessary, provide a reserve to cover any expected loss. We recognize the benefit of a tax position if it is more likely than not to be sustained. Recognized tax positions are measured at the largest amount more likely than not of being realized upon settlement. To the extent that we establish a reserve, our income tax expense would be increased. If we ultimately determine that payment of these amounts is unnecessary, we reverse the liability and recognize an income tax benefit during the period in which new information becomes available indicating the liability is no longer necessary. We record an additional income tax expense in the period in which new information becomes available indicating the tax liability is greater than our original estimate.

Share-based compensation

We recognize all share-based compensation expense as a cost in the consolidated financial statements. Equity classified awards are measured at the grant date fair value of the award and expense is recognized, net of estimated forfeitures, on a straight-line basis over the requisite service period for each separately vesting portion of the award and forfeiture rates are periodically updated for actual experience over the vesting term. For share options, we estimate the grant date fair value using the Black-Scholes option-pricing model.

Business Combinations

We apply the provisions of ASC 805, *Business Combinations*, in the accounting for our acquisitions. Assets and liabilities assumed are recognized at their acquisition date fair values. Goodwill as of the acquisition date is measured as the excess of consideration transferred and the net of the acquisition date fair values of the assets acquired and the liabilities assumed. Estimates are used in valuing certain intangible assets and include, but are not limited to, future expected cash flows as well as assumptions about the period to be used and discount rates. During the measurement period, which may be up to one year from the acquisition date, any adjustments to the value of the assets acquired and liabilities assumed are recorded with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated statements of operations.

JOBS Act accounting election

We are an emerging growth company, as defined in the JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

2020 Restructuring

On February 10, 2020, the Company announced it took additional steps in connection with its previously announced corporate restructuring. The additional restructuring will only affect personnel, including contract employees, and is expected to be complete by the end of 2020. The Company will incur between $1.2 million and $1.4 million in personnel costs, including salary continuation and other benefits over the first three quarters of 2020.

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

Interest rate risk

We had $65.3 million of debt outstanding as of December 31, 2019 under our Credit Agreement. We are exposed to interest rate risk from fluctuations in the three-month US LIBOR rate that is a component of the interest rate used to calculate interest expense on the debt.

Interest accrues on the outstanding principal amount of the term loan on a quarterly basis and is equal to the three-month US LIBOR rate plus a base rate of 4.75%, 4.25% or 4.00%. The base rate is affected by our financial performance as measured by the consolidated leverage ratio. The rate on the term loan was 6.85% as of December 31, 2019 and was reduced to 6.69% on January 1, 2020 due to a reduction in the US LIBOR rate. A hypothetical 100-basis point increase in interest rates, and assuming a constant base rate, would result in an additional $0.6 million in interest expense related to our external debt per year.

In July 2017, the head of the United Kingdom Financial Conduct Authority announced plans to phase out the use of LIBOR by the end of 2021. At this time, no consensus exists as to what rate or rates may become acceptable alternatives to LIBOR and we are unable to predict the effect of any such alternatives on our current interest rate.

Foreign currency exchange risk

We conduct business in all parts of the world and are thereby exposed to market risks related to fluctuations in foreign currency exchange rates. The U.S. dollar is the single largest currency in which our revenue contracts are denominated. Any decline in the value of local foreign currencies against the U.S. dollar results in our products and services being more expensive to a potential foreign customer. In those instances where our goods and services have already been sold, receivables may be more difficult to collect. Additionally, in jurisdictions where the revenue contracts are denominated in U.S. dollars and operating expenses are incurred in the local currency, any decline in the value of the U.S. dollar will have an unfavorable impact to operating margins. We have not entered into any foreign currency hedging transactions. We do not purchase or hold any derivative financial instruments for speculation or arbitrage.

We do not hold any cash in any investment accounts and all cash is deposited with financial institutions that management believes are of high credit quality. Our cash consists primarily of U.S. dollar denominated demand accounts.

Inflation risk

We do not believe that inflation has had a material effect on our business, financial condition or results of operations during the years ended December 31, 2017, 2018, and 2019.

Credit risk

We consider the credit risk of all customers and regularly monitor credit risk exposures in our trade receivables. Our standard credit terms with our customers are generally net 30 to 60 days. We had one customer representing more than 10% of trade receivables at December 31, 2018 and 2019. In addition, we had three customers representing more than 10% of revenue for the year ended December 31, 2017, and two customers for the years ended December 31, 2018 and 2019.

Item 8. Financial Statements and Supplementary Data.

The information required by this item is incorporated by reference to the consolidated financial statements and accompanying notes set forth on pages F-1 through F-40 of this Annual Report on Form 10-K.

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

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities and Exchange Act of 1934, as amended, or the Exchange Act), as of December 31, 2019, the end of the period covered by this Annual Report on Form 10-K. Based on such evaluation, our principal executive officer and principal financial officer have concluded, that as of such date, our disclosure controls and procedures were effective at a reasonable assurance level.

Management's Report on Internal Control over Financial Reporting

This Annual Report on Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our independent registered public accounting firm due to a transition period established by the rules of the Securities and Exchange Commission for newly public companies. Additionally, our auditors will not be required to formally opine on the effectiveness of our internal control over financial reporting pursuant to Section 404 until we are no longer an "emerging growth company" as defined in the JOBS act.

Changes in Internal Control

There were no changes in our internal control over financial reporting identified in management's evaluation pursuant to Rules 13a-15(e) and 15d-15(e) of the Exchange Act for the year ended December 31, 2019 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Effective January 1, 2019, we adopted Accounting Standards Codification Topic 842, Leases ("ASC 842"). Changes were made to the relevant business processes and the related control activities in order to monitor and maintain appropriate controls over financial reporting.

Limitations on Effectiveness of Controls and Procedures

None.

Item 9B. Other Information.

On March 19, 2020, the Company entered into an amendment to the offer letter (the "Offer Letter") with its Chief Financial Officer, Stephen Cumming (the "Amended Offer Letter"). The Amendment updates the severance provision of the Amended Offer Letter to provide that, if Mr. Cumming's employment with the Company (or its successor) is terminated without cause within 12 months following a Change in Control (as defined in the Cambium Networks Corporation 2019 Share Incentive Plan), Mr. Cumming will receive (i) one-year of base salary, payable in equal monthly installments during the 12-month period following such termination, (ii) a pro-rated annual bonus for the fiscal year in which such termination occurs, and (iii) continued participation in the Company's group health plan (to the extent permitted under applicable law and the terms of such plan) for Mr. Cumming and his eligible dependents for a period of 12 months at the Company's expense (collectively, the "Severance Benefits"). The Severance Benefits will be subject to Mr. Cumming's execution and non-revocation of a customary release of claims in favor of the Company within the period specified by the Company. Under the Amended Offer Letter, Mr. Cumming also remains entitled to six months' base salary continuation in the event his employment is terminated by the Company without cause prior to a Change in Control, as provided in his offer letter prior to the Amendment.

A copy of the Offer Letter is attached as Exhibit 10.32 and the Amended Offer Letter is attached as Exhibit 10.33 to this Annual Report on Form 10-K and are incorporated by this reference.

In addition, on March 19, 2020, the Company appointed Marc Nelson as its Chief Accounting Officer.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information required by Part III, Item 10, will be included in our Proxy Statement relating to our 2020 annual meeting of shareholders to be filed with the SEC within 120 days after the end of our year ended December 31, 2019, and is incorporated herein by reference.

Item 11. Executive Compensation.

Information required by Part III, Item 11, will be included in our Proxy Statement relating to our 2020 annual meeting of shareholders to be filed with the SEC within 120 days after the end of our year ended December 31, 2019, and is incorporated herein by reference.

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

Information required by Part III, Item 12, will be included in our Proxy Statement relating to our 2020 annual meeting of shareholders to be filed with the SEC within 120 days after the end of our year ended December 31, 2019, and is incorporated herein by reference.

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

Information required by Part III, Item 13, will be included in our Proxy Statement relating to our 2020 annual meeting of shareholders to be filed with the SEC within 120 days after the end of our year ended December 31, 2019, and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

Information required by Part III, Item 14, will be included in our Proxy Statement relating to our 2020 annual meeting of shareholders to be filed with the SEC within 120 days after the end of our year ended December 31, 2019, and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

Documents filed as part of this annual report on Form 10-K:

(1) ***Financial Statements***. The following index lists consolidated financial statements and notes thereto filed as part of this annual report on Form 10-K:

(2) ***Financial Statement Schedules.*** All schedules have been omitted because they are not applicable as the required information is included in the consolidated financial statements or notes thereto.

(3) ***Exhibits.*** A list of exhibits filed or furnished with this report on Form 10-K (or incorporated by reference to exhibits previously files by Cambium) is provided in the accompanying Exhibit Index.

Item 16. Form 10-K Summary

None.

Exhibit Index

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Exhibit	Filing Date
3.1	Form of Amended and Restated Memorandum and Articles of Association to be effective upon completion of this offering	S-1/A	333-231789	3.1	June 13, 2019
4.1	Form of Ordinary Share Certificate of Registrant	S-1/A	333-231789	4.1	June 24, 2019
4.2	Form of Shareholders Agreement by and among Registrant and certain security holders of Registrant to be effective upon completion of this offering	S-1/A	333-231789	4.2	June 13, 2019
10.1+	Form of Indemnification Agreement entered into between Registrant and its directors and executive officers	S-1	333-231789	10.1	May 29, 2019
10.2	Renewal Lease by Reference to an Existing Lease, Part Unit A, Linhay Business Park, Eastern Road, Ashburton, Devon TQ13 7UP, United Kingdom, dated as of November 22, 2016, by and between Registrant and Stephanie Myers Palk, Richard John Palk and Alison June Palk	S-1	333-231789	10.2	May 29, 2019
10.3	Renewal Lease by Reference to an Existing Lease, Unit B2/3, Linhay Business Park, Eastern Road, Ashburton, Devon TQ13 7UP, United Kingdom, dates as of November 22, 2016, by and between Registrant and Stephanie Myers Palk, Richard John Palk and Alison June Palk	S-1	333-231789	10.3	May 29, 2019
10.4	Renewal Lease by Reference to an Existing Lease, Unit B2/3, Linhay Business Park, Eastern Road, Ashburton, Devon TQ13 7UP, United Kingdom, dated as of April 9, 2018, by and between Registrant and Stephanie Myers Palk, Richard John Palk and Alison June Palk	S-1	333-231789	10.4	May 29, 2019
10.5	Renewal Lease by Reference to an Existing Lease, Unit D1, Linhay Business Park, Eastern Road, Ashburton, Devon TQ13 7UP, United Kingdom, dated as of November 22, 2016, by and between Registrant and Stephanie Myers Palk, Richard John Palk and Alison June Palk	S-1	333-231789	10.5	May 29, 2019
10.6	Renewal Lease by Reference to an Existing Lease, Unit D1, Linhay Business Park, Eastern Road, Ashburton, Devon TQ13 7UP, United Kingdom, dated as of April 9, 2018, by and between Registrant and Stephanie Myers Palk, Richard John Palk and Alison June Palk	S-1	333-231789	10.6	May 29, 2019
10.7	Office Lease, dated as of January 31, 2012, by and between Cambium Networks, Inc. and Atrium at 3800 Golf LLC	S-1	333-231789	10.7	May 29, 2019
10.8	The First Amendment, dated March 6, 2012, by and between Cambium Networks, Inc. and Atrium at 3800 Golf LLC	S-1	333-231789	10.8	May 29, 2019
10.9	The Second Amendment, dated February 21, 2013, by and between Cambium Networks, Inc. and Atrium at 3800 Golf LLC	S-1	333-231789	10.9	May 29, 2019
10.10	The Third Amendment, dated June 3, 2015, by and between Cambium Networks, Inc. and Atrium at 3800 Golf LLC	S-1	333-231789	10.10	May 29, 2019

10.11	The Fourth Amendment, dated January 18, 2018, by and between Cambium Networks, Inc. and Atrium at 3800 Golf LLC	S-1	333-231789	10.11	May 29, 2019
10.12	Lease Deed, dated as of June 20, 2016, by and between Cambium Networks Consulting Private Limited and Umiya Holdings Private Limited	S-1	333-231789	10.12	May 29, 2019
10.13	Lease, dated as of December 4, 2017, by and between Cambium Networks, Inc. and Silicon Valley Center Office LLC	S-1	333-231789	10.13	May 29, 2019
10.14++	Corporate Supply Agreement between Cambium Networks Limited and Flextronics Telecom Systems, Ltd. dated as of April 23, 2012	S-1	333-231789	10.14	May 29, 2019
10.15+	2019 Employee Share Purchase Plan	S-1/A	333-231789	10.15	June 13, 2019
10.16	Intentionally Omitted				
10.17+	2019 Share Incentive Plan	S-1/A	333-231789	10.17	June 13, 2019
10.18+	Form of Share Option Grant Notice and Restricted Share Award Agreement under 2019 Share Incentive Plan (to be executed by Atul Bhatnagar)	S-1/A	333-231789	10.18	June 13, 2019
10.19+	Form of Restricted Share Grant Notice and Restricted Share Award Agreement under 2019 Share Incentive Plan (to be executed by Atul Bhatnagar)	S-1/A	333-231789	10.19	June 13, 2019
10.20+	Form of Restricted Share Grant Notice and Restricted Share Award Agreement under 2019 Share Incentive Plan (to be executed by Atul Bhatnagar, Bryan Sheppeck and Ronald Ryan)	S-1/A	333-231789	10.20	June 13, 2019
10.21	Amended and Restated Credit Agreement, dated as of December 21, 2017, by and among Registrant, as Holdings, Cambium Networks, Ltd., as Borrower, Silicon Valley Bank, as Administrative Agent and Issuing Lender, and the lenders party thereto and the other loan parties thereto	S-1	333-231789	10.21	May 29, 2019
10.22	Waiver and First Amendment to Amended and Restated Credit Agreement, dated as of November 21, 2018, by and among Vector Cambium Holding (Cayman), L.P., as Holdings, Cambium Networks, Ltd., as Borrower, Silicon Valley Bank, as Administrative Agent and Issuing Lender, and the lenders party thereto and the other loan parties thereto	S-1	333-231789	10.22	May 29, 2019
10.23	Consent, Waiver and Second Amendment to Amended and Restated Credit Agreement, dated as of April 26, 2019, by and among Vector Cambium Holdings (Cayman), L.P. as Holdings, Cambium Networks, Ltd., as Borrower, Silicon Valley Bank, as Administrative Agent and Issuing Lender, and the lenders party thereto and the other loan parties thereto	S-1	333-231789	10.23	May 29, 2019
10.24+	Employment agreement, dated as of February 15, 2013, between Cambium Networks, Inc. and Atul Bhatnagar	S-1/A	333-231789	10.24	June 13, 2019
10.25+	Sales Incentive Plan Document for Regional Vice Presidents: SVP Global Channels	S-1/A	333-231789	10.25	June 13, 2019
10.26+	Sales Incentive Plan Document for SVP Global Sales	S-1/A	333-231789	10.26	June 13, 2019

10.27+	Form of Executive Restricted Share Unit Grant	S-1/A	333-231789	10.27	June 24, 2019
10.28+	Form of Executive Stock Option Grant	S-1/A	333-231789	10.28	June 24, 2019
10.29+	Form of Director Stock Option Grant	S-1/A	333-231789	10.29	June 24, 2019
10.30	Third Amendment to Amended and Restated Credit Agreement dated June 28, 2019	8-K	001-38952	10.30	July 1, 2019
10.31*	Sublease, dated December 1, 2019, by and between Cambium Networks, Inc. and Agfa Corporation				
10.32+*	Offer Letter, dated as of June 14, 2018, between Cambium Networks, Inc. and Stephen Cumming				
10.33+*	Amended Offer Letter, dated as of March 19, 2020, between Cambium Networks, Inc. and Stephen Cumming				
21.1	Subsidiaries of the Registrant	S-1	333-231789	21.1	May 29, 2019
23.1*	Consent of KPMG LLP (UK), independent registered public accounting firm				
23.2*	Consent of KPMG LLP (US), independent registered public accounting firm				
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.				
31.2*	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.				
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.				
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.				
101.INS*	XBRL Instance Document				
101.SCH*	XBRL Taxonomy Extension Schema Document				
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document				
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document				

+ Indicates management contract or compensatory plan

++ Confidential treatment has been granted for portions of this exhibit. These portions have been omitted from this Registration Statement and have been filed separately with the SEC.

Portions of the exhibit have been excluded because it both (i) is not material and (ii) would be competitively harmful if publicly disclosed.

* Filed herewith.

SIGNATURES

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

Cambium Networks Corporation

Date: March 23, 2020	By: /s/ STEPHEN CUMMING
	Stephen Cumming
	Chief Financial Officer

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

Name	Title	Date
/s/ ATUL BHATNAGAR **Atul Bhatnagar**	President and Chief Executive Officer (Principal Executive Officer)	March 23, 2020
/s/ STEPHEN CUMMING **Stephen Cumming**	Chief Financial Officer (Principal Financial Officer)	March 23, 2020
/s/ MARC NELSON **Marc Nelson**	Chief Accounting Officer (Principal Accounting Officer)	March 23, 2020
/s/ ROBERT AMEN **Robert Amen**	Chairman of the Board	March 23, 2020
/s/ ALEXANDER R. SLUSKY **Alexander R. Slusky**	Director	March 23, 2020
/s/ BRUCE FELT **Bruce Felt**	Director	March 23, 2020
/s/ VIKRAM VERMA **Vikram Verma**	Director	March 23, 2020

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors
Cambium Networks Corporation:

Opinion on the consolidated financial statements

We have audited the consolidated financial statements and the related notes (collectively, the consolidated financial statements) of Cambium Networks Corporation and subsidiaries (the Company) as listed in the accompanying index. In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018, and the results of its operations and its cash flows for each of the years in the two-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

Basis for opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements 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 audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We served as the Company's auditor from 2016 to 2019.

London, United Kingdom
May 3, 2019, except for Note 12 and Note 13 as to which the date is June 12, 2019.

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors
Cambium Networks Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheet of Cambium Networks Corporation and subsidiaries (the Company) as of December 31, 2019, the related consolidated statements of operations, comprehensive loss, shareholders' equity, and cash flows for the year ended December 31, 2019, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019, and the results of its operations and its cash flows for the year ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company has changed its method of accounting for leases effective January 1, 2019, due to the adoption of Accounting Standards Update 2016-02 and all related amendments, which established Accounting Standards Codification Topic 842, *Leases*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit. 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audit 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 audit 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. We believe that our audit provides a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2019.

Chicago, Illinois
March 23, 2020

CAMBIUM NETWORKS CORPORATION
Consolidated Balance Sheets
as of December 31, 2018 and 2019
(in thousands, except for share and per share amounts)

	December 31, 2018	December 31, 2019
ASSETS		
Current assets		
Cash	$ 4,441	$ 19,346
Receivables, net of allowances	60,389	58,628
Inventories, net	30,710	41,670
Recoverable income taxes	679	—
Prepaid expenses	3,465	5,323
Other current assets	5,889	4,350
Total current assets	105,573	129,317
Noncurrent assets		
Property and equipment, net	7,965	8,314
Software, net	3,944	3,395
Operating lease assets	—	6,872
Intangible assets, net	8,493	15,100
Goodwill	8,060	8,552
Deferred tax assets, net	8,022	929
TOTAL ASSETS	$ 142,057	$ 172,479
LIABILITIES AND SHAREHOLDERS' (DEFICIT) EQUITY		
Current liabilities		
Accounts payable	$ 23,710	$ 25,214
Accrued liabilities	18,263	15,034
Employee compensation	4,377	4,652
Current portion of long-term external debt, net	8,836	9,454
Payable to Sponsor	5,582	—
Deferred revenues	2,770	7,430
Other current liabilities	2,761	6,084
Total current liabilities	66,299	67,868
Noncurrent liabilities		
Long-term external debt, net	94,183	54,158
Deferred revenues	1,541	4,852
Noncurrent operating lease liabilities	—	5,335
Deferred tax liabilities, net	—	337
Other noncurrent liabilities	605	—
Total liabilities	162,628	132,550
Shareholders' (deficit) equity		
Share capital; $0.0001 par value; 500,000,000 shares authorized at December 31, 2018 and December 31, 2019; 77,179 shares issued and outstanding at December 31, 2018 and 25,753,603 issued and 25,672,983 outstanding at December 31, 2019	—	3
Additional paid in capital	772	104,773
Capital contribution	24,651	—
Treasury shares, at cost, 0 shares at December 31, 2018 and 80,620 shares at December 31, 2019	—	(1,094)
Accumulated deficit	(45,773)	(63,374)
Accumulated other comprehensive loss	(221)	(379)
Total shareholders' (deficit) equity	(20,571)	39,929
TOTAL LIABILITIES AND SHAREHOLDERS' (DEFICIT) EQUITY	$ 142,057	$ 172,479

The accompanying Notes are an integral part of these Consolidated Financial Statements.

CAMBIUM NETWORKS CORPORATION
Consolidated Statements of Operations
for the Years ended December 31, 2017 and 2018, and 2019
(in thousands, except for share and per share amounts)

	Years Ended December 31,		
	2017	2018	2019
Revenues	$ 216,671	$ 241,762	$ 267,028
Cost of revenues	105,960	126,267	135,799
Gross profit	110,711	115,495	131,229
Operating expenses			
Research and development	32,227	38,917	47,692
Sales and marketing	37,209	42,658	46,253
General and administrative	17,578	18,804	30,125
Depreciation and amortization	8,824	8,765	5,858
Total operating expenses	95,838	109,144	129,928
Operating income	14,873	6,351	1,301
Interest expense	5,018	8,113	8,076
Other expense	474	550	546
Income (loss) before income taxes	9,381	(2,312)	(7,321)
(Benefit) provision for income taxes	(418)	(799)	10,280
Net income (loss)	9,799	(1,513)	(17,601)
Less: Net income attributable to noncontrolling interest	671	—	—
Net income (loss) attributable to shareholders	$ 9,128	$ (1,513)	$ (17,601)
Earnings (loss) per share			
Basic and diluted	$ 0.67	$ (0.11)	$ (0.89)
Weighted-average number of shares outstanding to compute net earnings (loss) per share			
Basic and diluted	13,600,411	13,600,411	19,741,764
Share-based compensation included in costs and expenses:			
Cost of revenues	$ —	$ —	$ 211
Research and development	—	—	5,363
Sales and marketing	—	—	4,185
General and administrative	—	—	7,937
Total	$ —	$ —	$ 17,696

The accompanying Notes are an integral part of these Consolidated Financial Statements.

CAMBIUM NETWORKS CORPORATION
Consolidated Statements of Comprehensive Income (Loss)
for the Years ended December 31, 2017 and 2018, and 2019
(in thousands)

	Years Ended December 31,		
	2017	2018	2019
Net income (loss)	$ 9,799	$ (1,513)	$ (17,601)
Other comprehensive (loss) income			
Foreign currency translation adjustment	67	(372)	(158)
Comprehensive income (loss)	9,866	(1,885)	(17,759)
Less: Comprehensive income attributable to noncontrolling interest	671	—	—
Comprehensive income (loss)	$ 9,195	$ (1,885)	$ (17,759)

The accompanying Notes are an integral part of these Consolidated Financial Statements.

CAMBIUM NETWORKS CORPORATION
Consolidated Statements of Shareholders' (Deficit) Equity
for the Years ended December 31, 2017, 2018 and 2019
(in thousands)

	Share Capital									
	Shares	Amount	Additional paid in capital	Capital contribution	Treasury shares	Accumulated deficit	Accumulated other comprehensive income (loss)	Total shareholders' (deficit) equity	Noncontrolling interest	Total (deficit) equity
Balance at December 31, 2016	77	$ —	$ 772	$ 2,000	$ —	$ (52,528)	$ 84	$ (49,672)	$ 8,617	$ (41,055)
Net income	—	—	—	—	—	9,128	—	9,128	671	9,799
Distribution to noncontrolling interest	—	—	—	—	—	—	—	—	(9,288)	(9,288)
Sponsor contributed capital	—	—	—	88,363	—	—	—	88,363	—	88,363
Return of capital to sponsor	—	—	—	(65,712)	—	—	—	(65,712)	—	(65,712)
Foreign currency translation	—	—	—	—	—	—	67	67	—	67
Balance at December 31, 2017	77	—	772	24,651	—	(43,400)	151	(17,826)	—	(17,826)
Adjustment for adoption of ASC 606	—	—	—	—	—	(860)	—	(860)	—	(860)
Net loss	—	—	—	—	—	(1,513)	—	(1,513)	—	(1,513)
Foreign currency translation	—	—	—	—	—	—	(372)	(372)	—	(372)
Balance at December 31, 2018	77	—	772	24,651	—	(45,773)	(221)	(20,571)	—	(20,571)
Net loss	—	—	—	—	—	(17,601)	—	(17,601)	—	(17,601)
Share-based compensation	—	—	17,696	—	—	—	—	17,696	—	17,696
Issuance of shares upon vesting of restricted share units	29	—	—	—	—	—	—	—	—	—
Issuance of shares in Recapitalization and related reclassification	19,848	2	24,651	(24,651)	—	—	—	2	—	2
Issuance of shares in initial public offering, net of issuance costs of $8,228	5,800	1	61,372	—	—	—	—	61,373	—	61,373
Treasury shares withheld for net settlement in Recapitalization	(81)	—	282	—	(1,094)	—	—	(812)	—	(812)
Foreign currency translation	—	—	—	—	—	—	(158)	(158)	—	(158)
Balance at December 31, 2019	25,673	$ 3	$ 104,773	$ —	$ (1,094)	$ (63,374)	$ (379)	$ 39,929	$ —	$ 39,929

The accompanying Notes are an integral part of these Consolidated Financial Statements.

CAMBIUM NETWORKS CORPORATION
Consolidated Statements of Cash Flows
for the Years ended December 31, 2017 and 2018, and 2019
(in thousands)

	Years Ended December 31, 2017	2018	2019
Cash flows from operating activities:			
Net income (loss)	$ 9,799	$ (1,513)	$ (17,601)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation	2,069	2,836	3,583
Amortization of software and intangible assets	6,802	6,182	2,784
Amortization of debt issuance costs	209	576	1,141
Share-based compensation	—	—	17,696
Deferred income taxes	(1,884)	(1,863)	7,402
Other	201	952	311
Change in assets and liabilities:			
Receivables	(10,723)	(7,395)	622
Inventories	586	(10,009)	(7,634)
Accounts payable	4,726	4,261	2,096
Accrued employee compensation	3,012	(4,081)	14
Accrued liabilities	3,380	1,539	(1,296)
Accrued Sponsor interest and payables	5,081	564	(5,457)
Other assets and liabilities	(257)	(2,444)	(108)
Net cash provided by (used in) operating activities	23,001	(10,395)	3,553
Cash flows from investing activities:			
Purchase of property and equipment	(3,346)	(5,588)	(3,002)
Purchase of software	(2,585)	(1,912)	(944)
Cash paid for acquisitions	—	—	(4,666)
Net cash used in investing activities	(5,931)	(7,500)	(8,612)
Cash flows from financing activities:			
Proceeds from issuance of term loan	120,000	9,962	—
Proceeds from issuance of revolver debt	—	10,000	—
Repayment of term loan	(46,553)	(4,500)	(30,212)
Repayment of revolver debt	(19,962)	—	(10,000)
Payment of debt issuance costs	(2,832)	(396)	(336)
Proceeds from initial public offering, net of underwriters commission and fees	—	—	65,988
Payment of deferred offering costs	—	—	(4,616)
Taxes paid related to net share settlement of equity awards	—	—	(802)
Return of capital to Sponsor	(65,712)	—	—
Distribution to noncontrolling interest	(9,288)	—	—
Net cash (used in) provided by financing activities	(24,347)	15,066	20,022
Effect of exchange rate on cash	27	(107)	(58)
Net (decrease) increase in cash	(7,250)	(2,936)	14,905
Cash, beginning of period	14,627	7,377	4,441
Cash, end of period	$ 7,377	$ 4,441	$ 19,346
Supplemental disclosure of cash flow information:			
Income taxes paid	$ 1,490	$ 1,074	$ 1,702
Interest paid	$ 1,532	$ 7,614	$ 6,455
Significant non-cash activities:			
Issuance of shares for unreturned capital and accumulated yield	$ —	$ —	$ 49,252
Sponsor contributed capital	$ 88,363	$ —	$ —

The accompanying Notes are an integral part of these Consolidated Financial Statements.

Note 1. Description of Business and Summary of Significant Accounting Policies

Business

Cambium Networks Corporation ("Cambium" or the "Company"), incorporated under the laws of the Cayman Islands, is a holding company whose principal operating entities are Cambium Networks, Ltd. (UK), Cambium Networks, Inc. (USA), and Cambium Networks Private Limited (India). On October 28, 2011, Cambium acquired the point-to-point ("PTP") and point-to-multi-point ("PMP") businesses from Motorola Solutions, Inc. in an acquisition funded by investment funds affiliated with Vector Capital ("Sponsor").

Cambium Networks Corporation and its wholly owned subsidiaries provide wireless broadband networking solutions for network operators, including medium-sized wireless internet service providers, enterprises and government agencies.

The Company operates on a calendar year ending December 31. As such, all references to 2017, 2018 and 2019 contained within these notes relate to the calendar year, unless otherwise indicated.

Basis of Presentation

The Company's consolidated financial statements and accompanying notes are prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP") and include the accounts of Cambium Networks Corporation and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated. The consolidated financial statements have been prepared on the same basis other than the adoption with effect from January 1, 2018 of Financial Accounting Standards Board ("FASB") Accounting Standards Codification 606, *Revenue from Contracts with Customers*, and from January 1, 2019 of FASB Accounting Standards Codification 842, *Leases*, and, in the opinion of management, reflect all adjustments, which comprise only normal recurring adjustments necessary to state fairly the Company's financial position as of December 31, 2018 and 2019.

On June 6, 2019, the Company completed a 100:1 share subdivision to its sole shareholder of record. Accordingly, all share and per share amounts for all periods presented in these consolidated financial statements and notes thereto have been adjusted retrospectively to reflect the subdivision.

Initial public offering

The Company's registration statement on Form S-1 (the "IPO Registration Statement") related to its initial public offering ("IPO") was declared effective on June 25, 2019, and the Company's ordinary shares began trading on the Nasdaq Global Market on June 26, 2019. On June 28, 2019, the Company completed its IPO, in which the Company sold 5,800,000 shares at a price of $12.00 per share. The Company received aggregate net proceeds of $66.0 million after deducting underwriting discounts and commissions of $3.6 million. As of December 31, 2019, the Company used the proceeds from its IPO to pay offering costs of $4.6 million, paydown debt of $30.7 million, pay management fees owed to Vector Capital of $5.6 million, and pay $4.7 million to acquire select assets and assume select liabilities of the Xirrus Wi-Fi business from Riverbed Technology, Inc.

Immediately prior to the completion of the IPO, the Company effected a recapitalization, which comprised (i) an increase in the authorized and outstanding shares held by Vector Cambium Holdings (Cayman), L.P. ("VCH, L.P.") and (ii) the exchange of the vested share-based compensation awards held by its employees for the Company's shares and unvested share-based compensation awards for restricted share awards or restricted share units issued by the Company, in each case on a value-for-value basis (the "Recapitalization").

Immediately prior to the completion of the IPO, the Company filed its Amended and Restated Memorandum and Articles of Association, which authorizes a total of 500,000,000 ordinary shares. Upon the filing of the Amended and Restated Memorandum and Articles of Association, based on the IPO price of $12.00 per share as part of the Recapitalization described above, the Company (i) issued additional shares to VCH, L.P., such that its aggregate shareholding in it is now 17,704,754 shares, (ii) issued 2,129,663 net shares to its employees and service providers and (iii) granted 240,037 restricted share awards or restricted share units in respect of shares that would be subject to vesting based on continued employment with or provision of services to the Company. The Company recorded non-cash share-based compensation expense of $15.4 million in June 2019 related to the aforementioned issuance of the shares to its employees and service providers. In addition, the Company issued an aggregate 2,172,000 share options and restricted share units to employees and directors, effective upon pricing of the IPO of $12.00 per share and recorded an additional $2.2 million of share-based compensation expense related to these awards during 2019.

Use of Accounting Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. On an ongoing basis, the Company evaluates these estimates, including those related to the provision for excess and obsolete inventory, the carrying amount of estimated inventory returns, the estimated amount expected to be refunded to customers in respect of inventory returns, fair value of equity awards granted to employees and the associated forfeiture rates, fair value of assets acquired, liabilities assumed, goodwill and identifiable intangible assets in business combinations, leases, provision for income taxes, recoverability of deferred tax assets. The Company bases estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances. Actual results could differ from those estimates.

Segments

Management has determined that it operates as one operating segment and one reporting unit as it only reports financial information on an aggregate and consolidated basis to its Chief Executive Officer, who is the Company's chief operating decision maker. Decisions about resource allocation or operating performance assessments are not made below a total company level. Consequently, impairment testing is performed at the consolidated level as one reporting unit. See Note 16 – Segment information and revenues by geography for additional information.

Recognition of revenues

Revenues consist primarily of revenues from the sale of hardware products with essential embedded software. Revenues also include limited amounts for software products and extended warranty on hardware products. Substantially all products are sold through distributors and other channel partners, such as resellers and systems integrators.

ASC 606

The Company adopted Accounting Standards Codification ("ASC") 606, *Revenue from Contracts with Customers* ("ASC 606"), and all the related amendments on January 1, 2018, applying the modified retrospective method to all contracts not completed as of the date of adoption. The Company assessed the impact of ASC 606 using the prescribed 5-step model and based on this assessment concluded the recognition of revenue under ASC 606 is generally consistent with how revenue was being recognized prior to the adoption of the new standard. See Note 17 – Revenue from contracts with customers for further details on the impact of adoption.

In accordance with ASC 606, the Company recognizes revenue to reflect the transfer of control of promised products or services to a customer in an amount that reflects the consideration to which the Company expects to be entitled in exchange for products or services.

The Company accounts for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable.

The Company identifies its distinct performance obligations under each contract. A performance obligation is a promise in a contract to transfer a distinct product or service to the customer. Hardware products with essential embedded software, software products, and extended warranty on hardware products have been identified as separate performance obligations.

The transaction price is the amount of consideration to which the Company expects to be entitled in exchange for transferring products or services to a customer. Exchanges made as part of the Company's stock rotation program meet the definition of a right of return under ASC 606. An adjustment to revenue is made to adjust the transaction price to exclude the consideration related to products expected to be returned. The Company records an asset at the carrying amount of the estimated stock returns and a liability for the estimated amount expected to be refunded to the customer. The transaction price also excludes other forms of consideration provided to the customer, such as volume-based rebates and cooperative marketing allowances.

The Company recognizes revenue when, or as, it satisfies a performance obligation by transferring control of a promised product or service to a customer. Revenue from hardware products with embedded software is recognized when control is transferred to the customer, which is typically at the time of shipment. Software revenue is from perpetual license software and is recognized at the point in time that the customer is able to use or benefit from the software. Extended warranty is available for purchase on hardware products and is a performance obligation that is satisfied over time, beginning on the effective date of the warranty period and ending on the expiration of the warranty period. The Company recognizes revenue on extended warranties on a straight-line basis over the warranty period.

ASC 605

For 2017, under ASC 605, the Company recognized revenue when it was realized or realizable and earned. The Company considered revenue realized or realizable and earned when it had persuasive evidence of an arrangement, delivery had occurred, the sales price was fixed or determinable and collectability was reasonably assured. Delivery did not occur until products shipped to the customer, risk of loss transferred to the customer, and either customer acceptance was obtained, customer acceptance provisions lapsed or the Company had objective evidence that the criteria specified in the customer acceptance provisions had been satisfied. The sales price was considered to be fixed and determinable when all contingencies related to the sale had been resolved.

Hardware revenue was generally recognized at the time of shipment, provided that all other revenue recognition criteria had been met including transfer of risk to the customer and fulfilling all Company obligations that effect customer acceptance.

Software revenue was from perpetual license software and recognized at inception, typically at the point of making the software available to the customer if all revenue recognition criteria had been met. Supplemental management tools, including cnMaestro, LINKPlanner and cnArcher applications, were provided to help network operators design, install, and manage their networks, and as a means of driving sales of hardware products. The Company offered these applications without additional charge to the customer, as these applications are not essential for the operation of its products.

The Company offered a standard one-year warranty on its hardware products that included access to telephone and internet support and was included in the price of the product. The cost of providing the standard warranty was insignificant. The Company also offered for purchase an extended warranty on most of its products; a limited lifetime warranty on select hardware products; and an all risks advance replacement warranty covering additional types of equipment damage not covered by its standard warranty. The Company recognized revenue on extended warranties on a straight-line basis over the contractual period. Revenue was recognized net of volume-based rebates and cooperative marketing allowances that the Company provided to its distributors.

Deferred revenues included advance payments received from customers for hardware with embedded essential software and extended warranty. Deferred revenues included both current and non-current components with the non-current component expected to be recognized more than one year from the reporting date.

The Company included freight billed to customers in revenues and the cost of freight in cost of revenues.

Multiple performance obligations/Multiple-deliverable arrangements

The Company enters into revenue arrangements that may consist of multiple performance obligations (multiple deliverables under ASC 605), such as an arrangement containing hardware with embedded essential software and extended warranty.

Under ASC 606, the Company determines if the contract includes multiple performance obligations and allocates the transaction price to each performance obligation on a relative standalone selling price basis for each distinct product or service in the contract. The best evidence of standalone selling price is the observable price of a product or service when the Company sells that product or service separately in similar circumstances and to similar customers. If a standalone selling price is not directly observable, the Company estimates the transaction price allocated to each performance obligation using the expected costs plus a margin approach.

Prior to the adoption of ASC 606, the Company applied the guidance in ASC 605 to determine if the arrangement qualified as a multiple-deliverable agreement for separability and allocation of the revenue. For multiple-deliverable arrangements, deliverables are separated into more than one unit of accounting when (i) the delivered element(s) have value to the customer on a stand-alone basis and (ii) deliver of the undelivered element(s) is probable and substantially in the control of the Company. In these arrangements, the Company generally allocated revenue to all deliverables based on their relative selling prices, applying an estimated selling price as its best estimate of fair value.

Cash

The Company deposits cash with financial institutions that management believes are of high credit quality. The Company’s cash consists primarily of U.S. dollar denominated demand accounts.

Receivables and concentration of credit risk

Trade accounts receivable are recorded at invoiced amounts, net of the allowance for doubtful accounts. The Company considers the credit risk of all customers and regularly monitors credit risk exposure in its trade receivables. The Company's standard credit terms with their customers are generally net 30 to 60 days. The Company had one customer representing more than 10% of trade receivables at December 31, 2018 and 2019. The Company had three customers representing more than 10% of revenues for the year ended December 31, 2017, and two customers for the years ended December 31, 2018 and 2019.

The Company records an allowance for doubtful accounts for estimated probable losses on uncollectible accounts receivable. In estimating the allowance, management considers the aging of the accounts receivable, the Company's historical write offs, the credit worthiness of each distributor based on payment history, and general economic conditions, among other factors.

Inventory

The Company's inventories are primarily finished goods for resale and, to a lesser extent, raw materials, which have been either consigned to the Company's third-party manufacturers or are held by the Company. Inventories are stated at the lower of cost or net realizable value. In determining the cost of raw materials, consumables and goods purchased for resale, the weighted average purchase price is used. For finished goods, cost is computed as production cost including capitalized inbound freight costs.

The valuation of inventory also requires the Company to estimate excess or obsolete inventory. The determination of excess or obsolete inventory is estimated based on a comparison of the quantity and cost of inventory on hand to the Company's forecast of customer demand and in consideration of historical usage. Any adjustments to the valuation of inventory are included in cost of revenues.

Deferred offering costs

Deferred offering costs, consisting of legal, accounting and other fees and costs related to the IPO are capitalized and reflected in other current assets on the Company's consolidated balance sheets. There was $2.0 million of deferred offering costs capitalized at December 31, 2018. The Company deferred an additional $2.6 million of costs in 2019. The $4.6 million has been offset against IPO proceeds as a reduction of additional paid in capital. There were no deferred IPO costs at December 31, 2019.

Property and equipment

Per ASC 360, *Property, Plant, and Equipment*, property and equipment are stated at cost. The Company calculates depreciation expense using the straight-line method over the estimated useful lives of each asset based on its asset class. Leasehold improvements are amortized over the shorter of their useful lives or the lease term. See Note 4 – Property and equipment for the useful lives for each asset class.

Upon retirement or disposition, the asset cost and related accumulated depreciation are removed with any gain or loss recognized in general and administrative expense in the Consolidated Statements of Operations. For the years ended 2017, 2018 and 2019, the loss recognized was immaterial.

Software

Software may be purchased or developed internally for internal use. Costs related to internal use software are accounted for in accordance with ASC 350-40, *Internal Use Software*, where the expected life is greater than one year. Costs are expensed as incurred during the preliminary project stage of an internal use software project. Costs are capitalized once the project has been approved by management and is in the application development stage. Post implementation/operation costs, such as maintenance and training costs, are expensed as incurred. Any costs incurred to provide upgrades or enhancements are capitalized only if they provide additional functionality that did not previously exist.

Amortization of internal use software begins when the software is ready for internal use and is amortized over its estimated useful life. The amortization expense for internal use software is computed using the straight-line method over three to seven years.

Costs related to certain software, which is available for sale, are capitalized in accordance with ASC 985-20, *Costs of Software to be Sold, Leased, or Marketed*, when the resulting product reaches technological feasibility. The Company generally determines technological feasibility when it has a detailed program design that takes product function, feature and technical requirements to their most detailed, logical form and the product is ready for coding. The Company does not typically capitalize costs related to the development of first-generation product offerings as technological feasibility generally coincides with general availability of the software.

Amortization of software costs to be sold or marketed externally begins when the product is available for sale to customers and is amortized using the straight-line method over its estimated useful life of three years.

Business Combinations

The Company applies the provisions of ASC 805, *Business Combinations*, in the accounting for its acquisitions. It requires the Company to recognize separately from goodwill the assets acquired and the liabilities assumed at their acquisition date fair values. Goodwill as of the acquisition date is measured as the excess of consideration transferred and the net of the acquisition date fair values of the assets acquired and the liabilities assumed. While the Company uses its best estimates and assumptions to accurately value assets acquired and liabilities assumed at the acquisition date, its estimates are inherently uncertain and subject to refinement. As a result, during the measurement period, which may be up to one year from the acquisition date, it records adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the Consolidated Statements of Operations.

Critical accounting estimates in valuing certain intangible assets include but are not limited to future expected cash flows from customer relationships, as well as assumptions about customer attrition rate.

Other estimates associated with the accounting for acquisitions may change as additional information becomes available regarding the assets acquired and liabilities assumed.

Fair Value

ASC 820, *Fair Value Measurements and Disclosures* (“ASC 820”) defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. ASC 820 establishes a fair value hierarchy for valuation inputs that gives the highest priority to quoted prices in active markets for identical assets or liabilities and the lowest priority to unobservable inputs. ASC 820 requires the Company to use observable market data, when available, and to minimize the use of unobservable inputs when determining fair value. The fair value hierarchy prioritizes the inputs into three levels that may be used in measuring fair value as follows:

Level 1 – observable inputs which include quoted prices in active markets for identical assets or liabilities.

Level 2 – inputs which include observable inputs other than Level 1, such as quoted prices for similar assets or liabilities, quoted prices for identical or similar assets or liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the asset or liability.

Level 3 – inputs which include unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the underlying assets or liability. Level 3 assets and liabilities include those whose fair value measurements are determined using pricing models, discounted cash flow methodologies or similar valuation techniques, as well as significant management judgment or estimation.

Financial assets and liabilities are classified, in their entirety, based on the lowest level of input that is significant to the fair value measurement. Our assessment of the significance of a particular input, to the fair value measurement requires judgment, and may affect the valuation of assets and liabilities and their placement within the fair value hierarchy levels.

The fair value of the Company’s external debt under its Credit Agreement approximates its carrying value due to the floating interest rate (Level 2 of the fair value hierarchy). The Company measures the fair value of its Credit Agreement based on Level 2 inputs, which include quoted market prices and interest rate spreads of similar debt instruments. The fair value of the Company’s Credit Agreement was $105.5 million and $65.3 million as of December 31, 2018 and 2019, respectively.

The fair value of the Payable to Sponsor approximated its carrying value given the expected remaining duration of the contract (Level 1 of the fair value hierarchy). The fair value of the Payable to Sponsor was $5.6 million and $0.0 million as of December 31, 2018 and 2019, respectively. The Company made a payment of $5.6 million in July 2019 to extinguish this liability.

The fair value of cash approximates its carrying value (Level 1 of the fair value hierarchy).

The Company added a Level 3 liability for contingent consideration of $3.0 million during the three-month period ended September 30, 2019. The Company utilized a Monte Carlo Simulation to determine the fair value of the contingent consideration due to Riverbed Technology, Inc. associated with the acquisition of the Xirrus Wi-Fi assets and liabilities as of the acquisition date. The $3.0 million represented management's best estimate of the liability and was based on obtaining the required booking targets relating to the acquired assets for Riverbed to be eligible for the additional consideration. Based on bookings through December 31, 2019, management determined the entire $3.0 million of contingent consideration was earned. The Company made a payment of $2.7 million to Riverbed in November 2019 and paid the remaining $0.3 million in February 2020. At December 31, 2019, the $0.3 million of contingent consideration is included in Accrued liabilities on the Consolidated Balance Sheet.

Goodwill and intangible assets

Goodwill represents the excess purchase price over the estimated fair value of net assets acquired in a business combination. Goodwill is measured at cost and is not amortized. Intangible assets acquired, either individually or with a group of assets, are initially recognized and measured at fair value. The Company uses third-party specialists to assist management to determine fair values and estimated useful lives for intangible assets acquired in business combinations. Intangible assets with finite useful lives are amortized on a straight-line basis over their estimated useful lives of between 3 and 18 years. The Company has no intangible assets with indefinite lives.

In accordance with ASC 350, *Goodwill and Other*, the Company assesses goodwill for impairment at least annually and whenever events or circumstances that would more likely than not, reduce the fair value below its carrying value. For 2018 and 2019, the Company tested goodwill for impairment at December 31.

Annual impairment testing is completed at the reporting unit level. Management has concluded the Company operates as one reporting unit and one operating segment for annual impairment testing. Refer to Note 16 – Segment information and revenues by geography for more information.

The Company early adopted Accounting Standard Update ("ASU") 2017-04, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment* on January 1, 2018. In completing its impairment evaluations, the Company first assesses qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill. In performing this qualitative assessment, the Company assesses relevant events and changes in circumstances, including industry and market conditions, observable earnings before interest, taxes, depreciation and amortization ("EBITDA") multiples for peer companies, operating results, business plans, and entity-specific events that would affect the fair value or the carrying amount of a reporting unit. If it is more likely than not that the fair value of a reporting unit is less than its carrying value, the Company determines the fair value of the reporting unit and compares the fair value to its carrying value. If the fair value of the reporting unit exceeds its carrying amount, goodwill of the reporting unit is not considered impaired and no further steps are required.

Impairment of long-lived assets

The Company evaluates its long-lived assets, including property and equipment, software and intangible assets, for impairment whenever events or changes in circumstances indicate that the carrying value of these assets may not be recoverable. An impairment loss is recognized when the net book value of such assets exceeds the estimated future undiscounted cash flows attributable to the assets or asset group. If impairment is indicated, the asset is written down to its estimated fair value. The Company did not recognize any impairment losses for the years ended December 31, 2017, 2018 and 2019.

Leases

The Company has both cancelable and noncancelable operating leases for office space, vehicles, and office equipment. The Company adopted ASC 842, *Leases*, ("ASC 842") and all the related amendments on January 1, 2019, using the optional transition method to not apply the lease standard in the comparative periods presented. The Company elected the "practical expedient package" which permitted the Company to not reassess prior conclusions about lease identification, lease classification, and initial direct costs. The Company also elected the short-term lease recognition for all leases that qualify and to combine the lease and non-lease components into a single lease component for all of its leases.

In accordance with ASC 842, the Company recorded a right-of-use asset and lease liability on its consolidated balance sheet for all leases that qualified. The operating lease liability represents the present value of the future minimum lease payments over the lease term using the Company's incremental borrowing rate at the lease commencement date. The right-of-use asset reflects adjustments for the derecognition of deferred rent and prepaid rent. Leases with an initial term of 12 months or less are not recorded on the Company's consolidated balance sheet, and are expensed on a straight-line basis over the lease term. The Company does not include any renewal periods in the lease term for its leases as sufficient economic factors do not exist that would compel it to continue to use the underlying asset beyond the initial non-cancelable term. See Note 18 – Leases for further details.

Through December 31, 2018, the Company classified leases in accordance with guidance in ASC 840, *Leases*. For any leases that contained lease escalation or rent concession provisions, the Company recorded the total rent expense during the lease term on a straight-line basis over the term of the lease. The Company recorded the difference between the rent paid and the straight-line rent as an increase or decrease to the deferred rent liability included in accrued liabilities in its consolidated balance sheet.

Product warranties

The Company provides a one-year and three-year standard warranty on most of its products, and records a liability for the estimated future costs associated with potential warranty claims. Provisions for warranty claims are recorded at the time products are sold based on historical experience factors including product failure rates, material usage, and service delivery cost incurred in correcting product failures. These provisions are reviewed and adjusted by management periodically to reflect actual and anticipated experience. The warranty costs are reflected in the Company's consolidated statements of operations within cost of revenues. In certain circumstances, the Company may have recourse from its contract manufacturers for replacement cost of defective products, which it also factors into its warranty liability assessment.

Income taxes

The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in its financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statement carrying amount and the tax basis of assets and liabilities using enacted income tax rates in effect for the year in which the differences are expected to be recovered or settled. The effect of a change in income tax rates on deferred tax assets and liabilities is recognized in the income tax provision in the period that includes the enactment date.

In assessing the realizability of deferred tax assets, the Company considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized and adjusts the valuation allowances accordingly. In making such a determination, the Company considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations.

In general, it is the practice and intention of the Company to reinvest the earnings of its subsidiaries in those operations. As of December 31, 2017, 2018 and 2019, the Company had not made a provision for withholding taxes on approximately $4.1 million, $5.4 million and $8.5 million, respectively, of undistributed earnings that are indefinitely reinvested. Generally, such amounts become subject to taxation upon the remittance of dividends and under certain other circumstances. It is not practicable to estimate the amount of deferred tax liability to the undistributed earnings in these subsidiaries.

The Company may be subject to income tax audits in all of the jurisdictions in which it operates and, as a result, must also assess exposures to any potential issues arising from current or future audits of current and prior years' tax returns. Accordingly, the Company must assess such potential exposures and, where necessary, provide for any expected loss. The Company would recognize the benefit of a tax position if it is more likely than not to be sustained. Recognized tax positions are measured at the largest amount more likely than not to be realized upon settlement. To the extent that the Company establishes a liability, its income tax expense would be increased. If the Company ultimately determines that payment of these amounts is unnecessary, it would reverse the liability and recognize an income tax benefit during the period in which new information becomes available indicating that the liability is no longer necessary. The Company would record an additional income tax expense in the period in which new information becomes available indicating that the income tax liability is greater than its original estimate. The Company did not record such an adjustment for the years ended December 31, 2017, 2018 or 2019.

Share-based compensation

The Company accounts for share-based compensation in accordance with the guidance in ASC 718, *Share-based Payments*, by measuring and recognizing compensation expense for all share-based payments based on estimated grant date fair values for equity settled awards and period-end fair values for cash settled awards. Employees were granted both equity settled and cash settled awards under the Vector Cambium Holdings (Cayman), L.P. limited partnership agreement (VCH LPA) that included both time-based and performance-based equity awards and were subject to the achievement of varying participation thresholds and contingent conditions prior to being eligible to participate in distributions from VCH L.P. For the year ended December 31, 2018, both equity-settled and cash-settled awards had not met all of the contingent conditions. Accordingly, the Company did not recognize any share-based compensation expense in its financial statements prior to 2019.

Prior to the IPO, the Company effected a Recapitalization, which exchanged the vested share-based compensation awards held by its employees for shares and unvested share-based compensation awards for restricted shares or restricted share units issued by the Company, on a value-for-value basis. After completion of the Recapitalization and the IPO, the Company is no longer party to nor subject to any obligations under the VCH LPA. As a result of the Recapitalization and the completion of the Company's IPO, the contingent conditions had been met on some of the share-based compensation awards and the Company recorded share-based compensation of $15.4 million related to these awards during the year ended December 31, 2019.

Following the IPO, awards are granted under the 2019 Share Incentive Plan. The 2019 Share Incentive Plan provides for the grant of incentive share options, nonqualified share options, share appreciation rights, restricted share awards, restricted share units, or other share-based awards and performance awards. Effective upon pricing of the IPO at $12.00 per share, the Company issued an aggregate 2,172,000 share options and restricted share units to employees and directors and recorded an additional $2.2 million of share-based compensation expense related to these awards in the year ended December 31, 2019.

Contingencies

In accordance with ASC 450, *Contingencies*, the Company periodically evaluates all pending or threatened contingencies and any commitments, if any, that are reasonably likely to have a material adverse effect on its results of operations, financial position or cash flows. Liabilities for loss contingencies arising from claims, assessments, litigation, fines, penalties and other sources are recorded when it is probable that a liability has been incurred and the amount can be reasonably estimated. Legal costs incurred in connection with loss contingencies are expensed as incurred.

Foreign currency translation

The Company records any gain and loss associated with foreign currencies in accordance with ASC 830, *Foreign Currency Matters*. The reporting currency of the Company is the U.S. dollar and the functional currency for each operating subsidiary is the local currency of the operating subsidiary other than for Cambium Networks, Ltd. (UK) for which the functional currency is the U.S. dollar. Local currency denominated monetary assets and liabilities are translated at exchange rates in effect at the balance sheet date, and revenues, cost of revenues and expenses are translated at the average exchange rate in effect during the applicable period. The Company recognizes foreign exchange gains and losses in other expense on its consolidated statements of operations and accumulated other comprehensive income (loss) on its consolidated balance sheets.

Research and development costs

Research and development expenses consists primarily of salary and benefit expenses for employees and contractors engaged in research, design and development activities, and costs for prototypes, facilities and travel costs. For 2019, research and development expenses also include share-based compensation expenses. The Company also incurs research and development costs associated with the development of software for both internal use and to be marketed externally. Research and development costs, other than those associated with the development of software that meet the criteria for capitalization, are expensed as incurred.

For the years ended December 31, 2017, 2018 and 2019, the Company expensed $32.2 million, $38.9 million, and $47.7 million, respectively, which included $0, $0 and $5.4 million of share-based compensation expense, respectively, of research and development costs.

Recently adopted accounting pronouncements

Beginning in February 2016, the FASB issued ASU 2016-02, *Leases*, plus a number of related ASUs, which sets out the principles for the recognition, measurement, presentation and disclosures of leases for both parties to a contract (i.e., lessees and lessors) (collectively codified as "ASC 842").

ASC 842 requires lessees to recognize right-of-use ("ROU") assets and lease liabilities on the balance sheet for all leases unless a lessee elects not to apply ASC 842 to short-term leases. In addition, this standard requires both lessees and lessors to disclose certain key information about lease transactions. The Company adopted ASC 842 on January 1, 2019 (the effective date), using the optional transition method to not apply the new lease standard in the comparative periods presented and elected the "practical expedient package", which permits the Company to not reassess prior conclusions about lease identification, lease classification, and initial direct costs. ASC 842 also provides practical expedients for the Company's ongoing accounting. The Company elected the short-term lease recognition for all leases that qualify and to combine lease and non-lease components into a single lease component for all of its leases. On January 1, 2019, the Company recognized ROU assets and operating lease liabilities of $8.2 million and $8.8 million, respectively. The difference between ROU assets and operating lease liabilities recognized is due to deferred rent recorded under prior lease accounting standards. ASC 842 requires such balances to be reclassified against ROU assets at transition. Refer to Note 18 – Leases for further details.

In February 2018, the FASB issued ASU 2018-02, *Income Statement – Reporting Comprehensive Income: Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income*. This ASU provides an option to reclassify stranded tax effects within accumulated other comprehensive income ("AOCI") to retained earnings in the period in which the effect of the change in the U.S. federal corporate income tax rate in the 2018 U.S. Tax Cuts and Job Act, and information about the income tax effects that are reclassified. The Company adopted ASU 2018-02 as of January 1, 2019. The adoption of ASU 2018-02 had no impact on the Company's consolidated financial statements.

Beginning in 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers*, plus a number of related ASUs designed to clarify and interpret ASC 606 (collectively codified as "ASC 606"). The new standard replaced most existing revenue recognition guidance in U.S. GAAP. The core principle of the ASU requires revenue recognition based upon newly defined criteria, either at a point in time or over time, as control of good or services is transferred. The ASU requires additional disclosures about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and estimates, and changes in those estimates. The new standard became effective as of January 1, 2018 and the Company adopted ASC 606 using the modified retrospective transition method which required an adjustment to accumulated deficit for the cumulative effect of applying ASC 606 to active contracts as of the adoption date. The Company recorded an increase to accumulated deficit of $0.9 million upon adoption.

Recently issued accounting pronouncements not yet adopted

In December 2019, the FASB issued ASU 2019-12, *Simplifying the Accounting for Income Taxes*, as part of its Simplification Initiative to reduce the cost and complexity in accounting for income taxes. ASU 2019-12 removes certain exceptions related to the approach for intraperiod tax allocation, the methodology for calculating income taxes in an interim period, and the recognition of deferred tax liabilities for outside basis differences. ASU 2019-12 also amends other aspects of the guidance to help simplify and promote consistent application of GAAP. The guidance is effective for interim and annual period beginning after December 15, 2020, with early adoption permitted. The Company is assessing the impact on its consolidated financial statements.

In August 2018, the FASB issued ASU 2018-15, *Intangibles – Goodwill and Other Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs incurred in a Cloud Computing Arrangement That is a Service Contract*. The amendments in this update align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal-use software license). The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments in this update. The amendments in this update are effective for interim and annual periods for the Company beginning on January 1, 2020, with early adoption permitted. The amendments in this update should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. The Company has determined the impact the adoption of ASU 2018-15 will not be material to its consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments – Credit Losses (Topic 326)*. ASU 2016-13 sets forth an expected credit loss model which requires the measurement of expected credit losses for financial instruments based on historical experience, current conditions and reasonable and supportable forecasts. This replaces the existing incurred loss model and is applicable to the measurement of credit losses on financial assets measured at amortized cost, and certain off-balance sheet credit exposures. ASU 2016-13 is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019, with early adoption permitted. Adoption will require a modified retrospective transition. This ASU is effective for the Company in the first quarter of fiscal 2020. The adoption of ASU 2016-13 is not expected to be material to the consolidated financial statements.

Note 2. Business Combinations

In August 2019, the Company acquired select assets and assumed select liabilities of the Xirrus Wi-Fi products and cloud services business from Riverbed Technology, Inc. Xirrus has a portfolio of high-performance enterprise Wi-Fi access points and subscription services. The Company paid $2.0 million upon closing and in November 2019 paid an additional $2.7 million of the expected $3.0 million total contingent consideration subject to attaining certain booking targets related to sales of the Xirrus products. Booking targets were met by December 31, 2019 and the remaining $0.3 million is included in Accrued liabilities at December 31, 2019. This acquisition will enhance and accelerate the Company's existing network service application capabilities.

The Company accounts for business combinations in accordance with ASC 805, *Business Combinations*. The Company recorded the acquisition using the acquisition method of accounting and recognized assets and liabilities at their fair value as of the date of acquisition. The Company based the preliminary allocation of the purchase price on estimates and assumptions that are subject to change within the purchase price allocation period, which is generally one year from the acquisition date. The purchase accounting is not yet complete, and as such, the final allocation may be subject to future adjustments, including, but not limited to, inventory, intangibles, deferred revenue, and certain income tax matters. The Company determined the estimated fair value of identifiable intangible assets acquired primarily using an income approach.

The following table summarizes the preliminary allocation of the purchase price for Xirrus:

Goodwill	$	492
Customer relationships		7,670
Unpatented technology		540
Deferred revenue		(7,460)
Other net assets acquired		3,758
Total purchase price	$	5,000

Goodwill represents the excess of the total purchase consideration over the fair value of the underlying assets acquired and liabilities assumed. The acquisition is considered to be an asset acquisition for tax purposes and goodwill recognized in the acquisition is not deductible for tax purposes.

The results from this acquisition have been included in the Company's consolidated financial statements since the closing of the acquisition. Proforma information is not presented because the effect of the acquisition was not material to the Company's consolidated financial statements.

Note 3. Balance sheet components

Receivables, net

Receivables are recorded at invoiced amounts, net of the allowance for doubtful accounts. The receivables activity was as follows (in thousands):

	December 31, 2018	December 31, 2019
Trade accounts receivable	$ 60,235	$ 58,774
Other receivables	657	434
Total receivables	60,892	59,208
Less: Allowance for doubtful accounts	(503)	(580)
Receivables, net	$ 60,389	$ 58,628

The allowance for doubtful accounts activity was as follows (in thousands):

	Year ended December 31, 2018	Year ended December 31, 2019
Beginning balance	$ 823	$ 503
Increase, charged to expense	332	333
Recoveries	(213)	(204)
Reclassification to non-current	(180)	—
Amounts written-off	(259)	(52)
Ending balance	$ 503	$ 580

Inventories, net

Inventories consisted of the following (in thousands):

	December 31, 2018	December 31, 2019
Finished goods	$ 32,702	$ 42,402
Raw materials	1,958	4,227
Gross inventory	34,660	46,629
Less: Excess and obsolete provision	(3,950)	(4,959)
Inventories, net	$ 30,710	$ 41,670

The following table reflects the activity in the Company's inventory excess and obsolete provision (in thousands):

	Year ended December 31, 2018	Year ended December 31, 2019
Beginning balance	$ 2,766	$ 3,950
Inventory written off	(528)	(149)
Increase in excess and obsolete provision	1,712	1,158
Ending balance	$ 3,950	$ 4,959

Accrued liabilities

Accrued liabilities consisted of the following (in thousands):

	December 31, 2018	December 31, 2019
Accrued goods and services	$ 8,174	$ 8,364
Accrued inventory purchases	5,339	3,094
Accrued customer rebates	4,635	3,569
Other	115	7
Accrued liabilities	$ 18,263	$ 15,034

Accrued warranty

The accrued warranty provision is included in other current liabilities on the Company's consolidated balance sheets. Warranty obligations were as follows (in thousands):

	Year ended December 31, 2018	Year ended December 31, 2019
Beginning balance	$ 400	$ 488
Addition for Xirrus acquisition	—	180
Provision increase (decrease), net	88	38
Ending balance	$ 488	$ 706

Note 4. Property and equipment

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

	Useful Life	December 31, 2018	December 31, 2019
Equipment and tooling	3 to 5 years	$ 18,552	$ 22,150
Computer equipment	3 to 5 years	2,644	2,888
Furniture and fixtures	10 years	666	749
Total cost		21,862	25,787
Less: Accumulated depreciation		(13,897)	(17,473)
Property and equipment, net		$ 7,965	$ 8,314

Total depreciation expense was $2.1 million, $2.8 million and $3.6 million for the years ended December 31, 2017, 2018 and 2019, respectively.

Note 5. Software

Software consisted of the following (in thousands):

		December 31, 2018			December 31, 2019		
	Useful Life	Gross carrying amount	Accumulated amortization	Net balance	Gross carrying amount	Accumulated amortization	Net balance
Acquired and Software for internal use	3 to 7 years	$ 15,513	$ (12,802)	$ 2,711	$ 15,870	$ (13,471)	$ 2,399
Software marketed for external sale	3 years	1,534	(301)	1,233	1,805	(809)	996
Total		$ 17,047	$ (13,103)	$ 3,944	$ 17,675	$ (14,280)	$ 3,395

Amortization of acquired and internal use software is computed using the straight-line method over an estimated useful life of generally three to seven years. Amortization expense recognized on acquired and internal use software is reflected in depreciation and amortization in the consolidated statements of operations. Amortization expense was $2.0 million, $1.7 million and $0.7 million for the years ended December 31, 2017, 2018 and 2019, respectively.

The Company began capitalizing costs associated with software marketed for external sale in 2017. Amortization expense recognized on software to be sold or marketed externally was $0.1 million, $0.3 million and $0.5 million for the years ended December 31, 2017, 2018 and 2019, respectively, and is included in cost of revenues on the consolidated statements of operations.

Based on capitalized software assets at December 31, 2019, estimated amortization expense in future fiscal years is as follows (in thousands):

Year ending December 31,	Acquired and internal use software	Software marketed for external use	Total
2020	$ 730	$ 597	$ 1,327
2021	714	294	1,008
2022	442	105	547
2023	209	—	209
2024	115	—	115
Thereafter	189	—	189
Total amortization	$ 2,399	$ 996	$ 3,395

Note 6. Goodwill and Intangible Assets

When the Company acquired the trade assets of Motorola Solutions, Inc.'s wireless point-to-point and point-to-multipoint businesses, the transaction generated goodwill and certain intangible assets. The goodwill associated with this transaction was recorded by Cambium Networks Corporation and allocated to Cambium Networks, Ltd. and Cambium Networks, Inc. using a revenue and asset allocation method. Although goodwill has been allocated to two operating subsidiaries, as noted in Note 16 – Segment information and revenues by geography, the Company operates as one operating segment and one reporting unit and therefore, goodwill is reported, and impairment testing performed, at the Cambium Networks Corporation consolidated level.

See Note 2 – Business combinations for information regarding the acquisition completed during 2019.

The change in the carrying amount of goodwill for the years ended December 31, 2018 and 2019 was as follows (in thousands):

	December 31, 2018	December 31, 2019
Beginning balance	$ 8,060	$ 8,060
Additions attributable to acquisition	—	492
Ending balance	$ 8,060	$ 8,552

The Company completed a qualitative assessment of goodwill for 2018 and 2019. In completing the qualitative assessment, the Company assessed relevant events and changes in circumstances, including industry and market conditions, macroeconomic conditions such as a deterioration in general economic conditions, operating results, business plans, and entity-specific events.

Based on the results of the 2018 and 2019 qualitative assessment, the Company determined it was not more likely than not that the fair value of its reporting unit was less than its carrying amount and there was no impairment to record for either period. In addition, there were no triggering events or changes in circumstances during 2018 and 2019 that would have required a review other than at the annual test date.

The useful life, gross carrying value, accumulated amortization, and net balance for each major class of definite-lived intangible assets at each balance sheet date were as follows (in thousands):

		December 31, 2018			December 31, 2019		
	Useful Life	Gross carrying amount	Accumulated amortization	Net balance	Gross carrying amount	Accumulated amortization	Net balance
Unpatented technology	3 - 7 years	$ 14,120	$ (14,120)	$ —	$ 14,660	$ (14,195)	$ 465
Customer relationships	9 - 18 years	11,630	(4,630)	7,000	19,300	(5,631)	13,669
Patents	7 years	11,300	(11,300)	—	11,300	(11,300)	—
Trademarks	10 years	5,270	(3,777)	1,493	5,270	(4,304)	966
Total		$ 42,320	$ (33,827)	$ 8,493	$ 50,530	$ (35,430)	$ 15,100

The $0.5 million increase in unpatented technology and $7.7 million increase in customer relationships is related to the acquisition of Xirrus as discussed in Note 2 – Business combinations. Intangible assets are amortized over their expected useful life and none are expected to have a significant residual value at the end of their useful life. Intangible assets amortization expense was $4.8 million, $4.2 million and $1.6 million for the years ended December 31, 2017, 2018 and 2019, respectively.

Based on capitalized intangible assets as of December 31, 2019, estimated amortization expense amounts in future fiscal years are as follows (in thousands):

Year ending December 31,	Amortization
2020	$ 2,205
2021	2,118
2022	1,603
2023	1,498
2024	1,498
Thereafter	6,178
Total amortization	$ 15,100

Note 7. Debt

As of December 31, 2019, the Company had $65.3 million outstanding under its current term loan facility and $0.0 million in borrowings under its revolving credit facility.

As of December 31, 2018, the Company had $95.5 million outstanding under its current term loan facility and $10.0 million in borrowings under its revolving credit facility.

The following table reflects the current and noncurrent portions of the external debt facilities at December 31, 2018 and December 31, 2019 (in thousands):

	December 31, 2018	December 31, 2019
Term loan facility	$ —	$ 65,250
Tranche A	72,735	—
Tranche B	22,727	—
Revolving credit facility	10,000	—
Less debt issuance costs	(2,443)	(1,638)
Total debt	103,019	63,612
Less current portion of term facility	(9,500)	(10,000)
Current portion of debt issuance costs	664	546
Total long-term external debt	$ 94,183	$ 54,158

Secured credit agreements

On March 22, 2017, the Company entered into the second amended and restated credit agreement (“Second Amended and Restated Credit Agreement”) extending the Company’s existing credit facility from October 28, 2018 to March 22, 2022. The Second Amended and Restated Credit Agreement provided an aggregate borrowing amount not to exceed $45.0 million consisting of a term loan facility in the aggregate principal amount of $35.0 million and a revolving loan facility in an aggregate principal amount of $10.0 million, including a letter of credit sub-facility in the aggregate availability amount of $10.0 million. The Company initially borrowed $30.0 million under the term facility provisions of the Second Amended and Restated Credit Agreement.

On December 21, 2017, the Company entered into the third amended and restated credit agreement (as amended and restated, the “Credit Agreement”) to refinance the obligations under the Company’s existing credit facility, to an aggregate amount of $100.0 million, consisting of a term loan facility in the aggregate principal amount of $90.0 million and a revolving loan facility in an aggregate principal amount of $10.0 million, including a letter of credit sub-facility in the aggregate availability amount of $5.0 million. The Company may request borrowings under the revolving credit facility until December 21, 2022, which is the date it becomes due. The term loan matures and also becomes due on December 21, 2022.

The proceeds were used to: (i) pay fees and expenses incurred in connection with the refinancing; (ii) pay off the existing senior indebtedness under the Second Amended and Restated Credit Agreement; (iii) finance the return of capital to the Company's Sponsor; and (iv) provide ongoing working capital and other general corporate purposes. The Credit Agreement includes an accordion feature, permitting the Company on not more than five occasions prior to the fourth anniversary of the date of the Credit Agreement to increase the aggregate amount of the term loan by up to $40.0 million, the proceeds of which may be used for permitted acquisitions.

In November 2018, the Company entered into a Waiver and First Amendment to the Credit Agreement ("Amendment"). The Amendment waived certain events of default, reset the debt covenants, and modified and amended certain terms of the Credit Agreement. Any terms not amended or modified by the Amendment were governed under the existing Credit Agreement. The Events of Default (as defined in the Credit Agreement) occurred as a result of the Company's failure to maintain certain financial covenants. The Events of Default occurred for the months ended May 31, 2018, July 31, 2018, and August 31, 2018 with the minimum adjusted quick ratio and for the quarter ended September 30, 2018 with the maximum consolidated leverage ratio and the minimum consolidated fixed charge coverage ratio (together known as the "Existing Events of Default").

Per the Amendment, the outstanding term loan was continued as two separate tranches of term loans, one tranche in the aggregate principal amount outstanding of $73.9 million (inclusive of the conversion of the outstanding revolving loan) as of the Amendment effective date ("Tranche A") and a separate tranche in the aggregate principal amount outstanding of $22.7 million as of the Amendment effective date ("Tranche B"). The outstanding revolving loan in the amount of $10.0 million was converted into, aggregated with, and continued as Tranche A as of the Amendment effective date. The Amendment also maintained the $10.0 million revolving credit facility.

The Amendment also amended the following financial covenants: Consolidated EBITDA to reflect changes to the new definition and minimum requirements for consolidated EBITDA; consolidated fixed charge coverage ratio to reflect the modification to reduce the minimum ratio until June 30, 2020; consolidated leverage ratio to reflect the modifications to increase the maximum ratio until June 30, 2019; and minimum adjusted quick ratio to reflect the modification to reduce the ratio through the maturity date of the loan. Further, the repayment schedule for the principal repayment of the term loans was amended to reflect the new installment amounts due on the last day of each fiscal quarter.

In connection with the execution of the Amendment, Vector Capital IV, L.P., an affiliate of the general partner of the Company's sole shareholder, executed a Limited Guaranty agreement whereby it agreed to guarantee the Tranche B loan up to a maximum of the lesser of: (i) $25.0 million and (ii) an amount equal to (a) 1.10 multiplied by (b) an amount equal to the then aggregate principal amount of the Tranche B loan.

The Company incurred a $0.25 million administrative fee and all lenders' term commitment percentage and revolving commitment percentage remained the same as a result of the Amendment.

The amended term loan is repayable quarterly as follows: (i) $2.375 million is payable in each quarter for the first four (4) payment dates starting after January 1, 2019; and (ii) $2.5 million is payable in each quarter of each year thereafter, with the remaining principal due on maturity on December 21, 2022. Principal payments are applied to Tranche A until the balance is paid in full. In addition, 50% of excess cash, defined as EBITDA less tax, capital expenditures, certain investments, scheduled loan repayments, declared distributions, interest, working capital requirement and other items paid in cash to the extent included as an add back to EBITDA, is payable to the lenders at the end of each year as a repayment of outstanding borrowings.

Interest accrues on the outstanding principal amount of the term loan on a quarterly basis and is equal to the three-month USD LIBOR rate plus a base rate of 4.75%, 4.25% or 4.00%. In addition to paying the interest on the outstanding principal under the term loan facility, the Company is required to pay a commitment fee in respect of the unutilized commitments under the revolving credit facility, payable quarterly in arrears. The Company is also required to pay letter of credit fees on the maximum amount available to be drawn under all outstanding letters of credit in an amount equal to the applicable margin on LIBOR based borrowings under the revolving credit facility on a per annum basis, payable in arrears, as well as customer fronting fees for the issuance of letters of credit fees and agency fees.

The Company is permitted to voluntarily reduce the unutilized portion of the commitment amount and repay outstanding loans under the Credit Agreement at any time without premium or penalty, other than customary breakage costs with respect to LIBOR based loans.

Maturities on the long-term external debt outstanding at December 31, 2019 are as follows (in thousands):

Year ending December 31,	
2020	$ 10,000
2021	10,000
2022	45,250
Total	$ 65,250

Borrowings under the Credit Agreement are secured by a first-priority lien on substantially all of the Company's assets, the equity interests in the Company's subsidiaries, and any intercompany debt. The Credit Agreement also contains certain customary mandatory prepayment provisions. If certain events, as specified in the Credit Agreement, occur, the Company may be required to repay all or a portion of the amounts outstanding under the Credit Agreement.

On April 26, 2019, the Company entered into a Consent, Waiver and Second Amendment to the Credit Agreement ("Second Amendment"). The Second Amendment waived the Company's failure to comply with the quarterly maximum consolidated leverage ratio and minimum consolidated fixed charge coverage ratio at December 31, 2018.

The Second Amendment also modified the following financial covenants: Minimum Adjusted Quick Ratio to exclude certain accrued legal expenses associated with the Company's IPO and the current lease liability associated with the adoption of ASC 842 starting in April 2019 and continuing through maturity of the loan; consolidated fixed charge coverage ratio to reflect the change in the time period from a trailing twelve-month to a trailing three-month, trailing six-month and trailing nine-month for the quarters ended March 31, 2019, June 30, 2019 and September 30, 2019, respectively, and increased the minimum ratio just for the quarter ended June 30, 2019; and the consolidated leverage ratio to reflect the increase in the maximum ratio until June 30, 2019. There were no modifications to the interest rate, loan maturity date, principal repayment schedule or total borrowings.

On June 21, 2019, the Company entered into a Waiver Agreement ("Waiver Agreement"). The Waiver Agreement waived the Company's failure to comply with the monthly minimum adjusted quick ratio at May 31, 2019. The Waiver Agreement did not modify any financial covenants, interest rate, loan maturity date, principal repayment schedule, or total borrowings.

On June 28, 2019, the Company entered into a Third Amendment to the Credit Agreement (the "Third Amendment").

Pursuant to the Third Amendment, certain actions taken by the Company in connection with its IPO were consented to by Silicon Valley Bank and the lenders, including (i) the exchange of outstanding vested and unvested Class B units and phantom units in VCH L.P. for ordinary shares of the Company (in exchange for vested units) and restricted stock awards (for unvested Class B units) and restricted stock units (for unvested phantom units) and the adoption of the employee share incentive plan and employee share purchase plan and forms of award agreement thereunder by the Company; (ii) the payment of accrued and unpaid management fees owed to an affiliate of VCH, L.P.; and (iii) the entering into of the Shareholder Agreement by and between VCH, L.P. as a guarantor and loan party and termination of the guaranty granted by an affiliate of VCH, L.P. In addition, the Tranche A and Tranche B are dissolved and only one tranche of term loan remains.

On July 1, 2019, the Company paid $30.7 million of principal under the Credit Agreement out of the net proceeds of its IPO. Following the repayment, the total term loan commitment under the Credit Agreement was reduced to $70.0 million and all outstanding amounts under the revolving credit facility were repaid, leaving an available revolving commitment of $10.0 million. The minimum consolidated fixed charge coverage ratio for the trailing twelve-month period ending December 31, 2019 and each trailing twelve-month quarterly period ending thereafter was amended to 1.25:1.00. All other financial covenants remained the same.

The Credit Agreement contains customary affirmative and negative covenants, including covenants that limit or restrict the Company and its subsidiaries' ability to, among other things, incur indebtedness, grant liens, merge or consolidate, dispose of assets, pay dividends or make distributions, make investments, make acquisitions, prepay certain indebtedness, change the nature of its business, enter into certain transactions with affiliates, enter into restrictive agreements, and make capital expenditures, in each case subject to customary exceptions for a credit facility of this size and type.

The Company's current debt covenant requirements reflect the following limits required, based on the time period noted, for compliance with the covenant:

		Quarter ending				
Covenant	**Criteria**	**December 31, 2019**	**March 31, 2020**	**June 30, 2020**	**September 30, 2020**	**December 31, 2020**
Monthly minimum adjusted quick ratio	Min ratio	Non quarter-end months 1.00:1.00			Quarter-end months 1.15:1.00	
Quarterly consolidated fixed charge coverage ratio	Min ratio	1.25:1.00	1.25:1.00	1.25:1.00	1.25:1.00	1.25:1.00
Quarterly consolidated fixed charge coverage ratio	Time period	Trailing twelve-month				
Quarterly consolidated leverage ratio	Max ratio	3.00:1.00	3.00:1.00	2.75:1.00	2.50:1.00	2.50:1.00
Quarterly consolidated leverage ratio	Time period	Trailing twelve month				

Based on the modified covenants, the Company believes that all covenants will be met at subsequent testing dates for the next twelve months and has classified the amounts due in excess of twelve months as noncurrent. As of December 31, 2019, the Company was in compliance with all affirmative and negative quarterly covenants as defined in the Third Amendment.

Interest expense, including bank charges and amortization of debt issuance costs on the external debt, was $2.2 million, $8.1 million and $8.1 million for the years ended December 31, 2017, 2018 and 2019, respectively. Interest expense for the year ended December 31, 2019 included $0.5 million of additional amortization of deferred issuance costs for the write-down of deferred issuance costs related to the $20.7 million prepayment of the term loan.

Note 8. Loan from Sponsor and contributed capital

In October 2011, a subsidiary of the Company issued convertible preferred equity certificates ("CPECs") to the Sponsor in connection with the purchase of the PTP and PMP businesses from Motorola Solutions, Inc. Under ASC 815-10, the option to convert the CPECs into ordinary shares does not meet the definition of a derivative. Therefore, the CPECs were classified as debt, as they did not provide for net settlement and there was no active market for the shares. The CPECs had both a fixed and variable yield component, with the fixed yield component of 1% per annum. The variable yield was dependent upon the income obtained from amounts lent to, and equity investment in, certain subsidiaries. The Company had the option to either accrue the interest or cash settle, and since the inception of the CPECs, the Company elected to accrue the interest. The CPECs were redeemable at the earlier of 49 years after issuance or upon the occurrence of specified events, including the realization of certain of the Company's investments.

On July 31, 2017, in connection with the dissolution of the subsidiary, the CPECs and associated accrued interest were redeemed, and simultaneously the Sponsor made a non-cash capital contribution of $88.4 million. The $88.4 million non-cash capital contribution represented principal on the CPECs of $62.5 million and accrued interest of $25.9 million. Interest expense on the loan from Sponsor was $2.8 million, $0.0 million, and $0.0 million in 2017, 2018 and 2019, respectively.

On December 21, 2017, the Company made a cash return of contributed capital to VCH, L.P. in the amount of $65.7 million.

On June 28, 2019, in connection with the Recapitalization, the unreturned capital and accumulated yield of $49.2 million payable to holders of Class A Units under the VCH, LPA was settled in the form of additional shares in the Company. The Company issued shares to VCH., L.P on a value-for-value basis based on the $12.00 per share offering price. The Recapitalization was recorded as a non-cash transaction which resulted in the transfer of equity ownership from capital contribution to additional paid in capital. After completion of the Recapitalization, the Company is neither party to nor subject to any obligations under the VCH LPA.

Note 9. Employee benefit plans

The Company's employee benefit plans currently consist of a defined contribution plan in the United States and a separate defined contribution plan in the UK. The Company does not offer any other postretirement benefit plans, such as retiree medical and dental benefits or deferred compensation agreements to its employees or officers.

U.S. plan

U.S. regular, full-time employees are eligible to participate in the Cambium Networks, Inc. 401(k) Plan, which is a qualified defined contribution plan under section 401(k) of the Internal Revenue Service Code. Under the Cambium Networks, Inc. 401(k) Plan, the Company contributes a dollar-for-dollar match of the first 4% an employee contributes to the plan. Employees are eligible to participate on the first day of the month following their date of hire and begin receiving company contributions three-months after they become eligible to participate in the plan. Company matching contributions are made each pay period, but the funds do not vest until the employee's second anniversary of employment with the Company. Employees are always fully vested in their own contributions. All contributions, including the Company match, are made in cash and invested in accordance with the participants' investment elections. Contributions made by the Company under the Cambium Networks, Inc. 401(k) Plan were $0.7 million, $1.0 million and $1.1 million for the years ended December 31, 2017, 2018 and 2019, respectively.

UK plan

Regular, full-time UK employees are eligible to participate in the Cambium Networks Ltd. Stakeholder Pension Scheme, which is a qualified defined contribution plan. Employees are eligible to participate on the first of the month following receipt of their enrollment form, and eligible employees are automatically enrolled in the plan at a default employee contribution rate of 3% and a company contribution rate of 5% of the employee's basic salary. The Company contribution rate increases by 1% for each additional 1% that the employee contributes up to a maximum of 7%. Company matching contributions vest immediately and employees are always vested in their own contributions. All contributions, including the Company match, are made in cash and deposited in the participant's account each pay period. The total contributed by the Company under this plan was $0.4 million, $0.4 million and $0.4 million for the years ended December 31, 2017, 2018 and 2019, respectively.

Note 10. Other expense

Other expenses were $0.5 million, $0.6 million and $0.5 million for the years ended December 31, 2017, 2018 and 2019, respectively, and represents foreign exchange losses.

Note 11. Share-based compensation

2011 Management incentive compensation plan

Prior to its IPO, the Company's management incentive compensation represented management incentive units in its sole shareholder, VCH, L.P.

Just prior to the IPO, the Company effected the Recapitalization, which comprised an increase in the authorized and outstanding shares held by VCH, L.P., and the exchange of the vested share-based compensation awards held by its employees for its ordinary shares and unvested share-based compensation awards for restricted shares or restricted share units issued by the Company, in each case, on a value-for-value basis. After completion of the Recapitalization and the IPO, the Company is no longer party to nor subject to any obligations under the VCH LPA. As a result of the Recapitalization and the completion of the Company's IPO, the contingent conditions had been met on some of the equity-settled and cash-settled awards and the Company recorded one time share-based compensation expense of $15.4 million related to these awards in the year ended December 31, 2019.

The following table reflects the number of MIUs and phantom units (not including the Class A units) exchanged as part of the Recapitalization:

	Number of units (time-based)	Number of units (performance- based)
Balance at December 31, 2017	9,843,098	5,417,093
Granted	2,440,000	—
Forfeitures and cancellations	(139,800)	—
Balance at December 31, 2018	12,143,298	5,417,093
Granted	234,000	—
Forfeitures	(82,100)	—
Recapitalization - cancellations	(2,622,250)	—
Recapitalization - converted to restricted shares	(758,138)	(4,038,643)
Recapitalization - converted to ordinary shares	(8,914,810)	(1,378,450)
Balance at December 31, 2019	—	—

The numbers above are on a pre-Recapitalization basis; the outstanding management incentive units and phantom units were not exchanged one-for-one, to reflect the value for value exchange including a reverse split of outstanding units. Following the Recapitalization, management incentive and phantom units were exchanged for an aggregate of 2,220,788 shares, 240,327 restricted share awards and restricted share units, less 80,620 shares held in treasury in payment of amounts due against the outstanding management incentive and phantom units. The restricted share awards and restricted share units were issued under our 2019 Share Incentive Plan, and are included in the tables below.

2019 Share incentive plan

In June 2019, the Company's Board of Directors adopted, and its shareholders approved, the 2019 Share Incentive Plan ("2019 Plan"). The 2019 Plan provides for the grant of incentive share options, nonqualified share options, share appreciation rights, restricted share awards ("RSAs"), restricted share units ("RSUs"), other share-based awards and performance awards. The number of shares that may be issued under the 2019 Plan is 3,400,000, in addition to the 240,037 RSAs and RSUs the Company granted in substitution for unvested Class B Units or phantom units in connection with the Company's IPO based on a price of $12.00 ("Recapitalization Awards"). The share reserve under the 2019 Plan will be automatically increased on the first day of each fiscal year, beginning with the fiscal year ending December 31, 2020 and continue until, and including, the fiscal year ending December 31, 2029. The number of shares added annually will be equal to the lowest of 1,320,000 shares, 5% of the number of the Company's shares outstanding on the first day of such fiscal year, or an amount determined by the Board of Directors.

The Company's employees, officers, directors, consultants, and advisors are eligible to receive awards under the 2019 Plan. Incentive share options, however, may only be granted to its employees. Participants in the 2019 Plan will also consist of persons to whom restricted share awards and restricted share units are granted in substitution for Class B Units in VCH, L.P. in connection with the Company's IPO. The Company granted an aggregate of 2,172,000 share options and restricted share units under the 2019 Plan effective upon pricing of the offering, with an exercise price of options equal to $12.00 per share and recorded share-based compensation expense of $2.2 million during the year ended December 31, 2019. Subsequent to this offering, the Company granted an additional 845,000 share options under the plan during 2019. For the year ended December 31, 2019, the Company recorded additional share-based compensation expense of $0.1 million related to these share options.

The following table summarizes changes in the number of shares available for grant under the Company's equity incentive plans during the year ended December 31, 2019:

	Number of shares
Available for grant at December 31, 2018	—
Recapitalization awards authorized	240,037
2019 Share Incentive Plan	3,400,000
RSUs and RSAs granted, including Recapitalization awards	(294,037)
Options granted	(2,963,000)
Forfeitures of options	43,022
Available for grant at December 31, 2019	426,022

Share-based compensation

The following table shows total share-based compensation expense for the years ended December 31, 2017, 2018 and 2019 (in thousands):

	Year ended December 31,		
	2017	2018	2019
Cost of revenues	$ —	$ —	$ 211
Research and development	—	—	5,363
Sales and marketing	—	—	4,185
General and administrative	—	—	7,937
Total share-based compensation expense	$ —	$ —	$ 17,696

As of December 31, 2019, the Company estimates the pre-tax unrecognized compensation expense of $13.3 million related to all unvested share-based awards, including share options, restricted share units and restricted share awards will be recognized through the fourth quarter of 2023. The Company expects to satisfy the exercise of share options and future distributions of shares for restricted share units and restricted share awards by issuing new ordinary shares which have been reserved under the 2019 Plan.

In connection with the Recapitalization, phantom units, which were previously accounted for as liability-settled awards, were modified to equity-settled awards. Due to a performance condition associated with the phantom units, a liability was not recognized in the Company's consolidated financial statements, but was disclosed as liability-settled awards. For the year ended December 31, 2019, the Company recognized $2.2 million in share-based compensation expense associated with the vesting of phantom unit awards upon Recapitalization.

The Company utilized a forfeiture rate of 5% during the year ended December 31, 2019 for estimating the forfeitures of share options and restricted share units granted.

Share options

The following is a summary of option activity for the Company's share incentive plans for year ended December 31, 2019:

	Options	Weighted average exercise price	Weighted Average remaining contractual term (years)	Aggregate intrinsic value
Outstanding at December 31, 2018	—	$ —	—	$ —
Options granted	2,963,000	$ 10.00	—	$ —
Options forfeited	(42,500)	$ 12.00	—	$ —
Outstanding at December 31, 2019	2,920,500	$ 10.00	9.6	$ 1,932,000
Options exercisable at December 31, 2019	140,625	$ 12.00	9.5	$ —
Options vested and expected to vest at December 31, 2019	2,776,797	$ 10.00	9.6	$ 1,838,832

Share options typically have a contractual term of ten years from grant date.

During the year ended December 31, 2019, the aggregate intrinsic value of options exercisable under the Company's share incentive plans was $0.00 as determined as of the date of grant. The Company had 0 options exercised during the year ended December 31, 2019.

At December 31, 2019, there was $10.3 million in unrecognized pre-tax share-based compensation expense, net of estimated forfeitures, related to unvested share option awards. The unrecognized share-based compensation expense is expected to be recognized through the fourth quarter of 2023.

The Company estimates the fair value of share options using the Black-Scholes option pricing model. The fair value of share options is being amortized on a straight-line basis over the requisite service period of the awards. The fair value of share options is estimated using the following weighted-average assumptions:

	For the years ended December 31,		
	2017	2018	2019
Expected dividend yield	—	—	—
Risk-free interest rate	2.27%	2.70%	1.81%
Weighted-average expected volatility	46.8%	46.8%	40.8%
Expected term (in years)	6.0	6.0	6.1
Weighted average grant-date fair value per share of options granted	$ —	$ —	$ 4.34

Restricted shares

The following is a summary of restricted shares activity for the Company's share incentive plans for the year ended December 31, 2019:

	Units	Weighted average grant date fair value
RSU and RSA balance at December 31, 2018	—	$ —
RSUs and RSAs granted	294,037	$ 12.00
RSUs and RSAs vested	(34,511)	$ 12.00
RSUs and RSAs forfeited	(2,407)	$ 12.00
RSU and RSA balance at December 31, 2019	257,119	$ 12.00
RSUs and RSAs expected to vest at December 31, 2019	257,119	$ 12.00

Upon completion of the Company's IPO, 240,037 RSAs and RSUs were granted to employees in substitution for unvested Class B Units or phantom units with a grant date fair value of $12.00, of which 34,111 of the RSAs and RSUs awards granted carry-forward their prior vesting terms and expiration dates and 205,926 RSA equity awards vest based upon the achievement of a total equity return multiple performance condition. In addition, 54,000 RSAs were granted under the Company's 2019 Share Incentive Plan.

At December 31, 2019, there was $3.0 million in unrecognized pre-tax compensation expense, net of estimated forfeitures, related to unvested share awards. The unrecognized compensation expense is expected to be recognized through the fourth quarter of 2022.

Employee share purchase plan

In June 2019, the Company's Board of Directors adopted, and its shareholders approved, the Employee Share Purchase Plan ("ESPP"). The ESPP was effective on June 25, 2019; however, no offering period or purchase period under the ESPP will begin unless and until determined by the Company's Board of Directors. A total of 550,000 shares will be available under the ESPP. The number of shares that will be available for sale under the ESPP also includes an annual increase on the first day of each fiscal year beginning in 2020, equal to the lesser of: 275,000 shares; 1% of the outstanding shares as of the last day of the immediately preceding fiscal year, or such other amount as the administrator may determine. The purchase price of the shares will be 85% of the lower of the fair market value of our shares on the first trading day of each offering period or on the purchase date.

Note 12. Share capital – shares

The following table reflects the share capital activity:

	Number of shares	Value (in thousands)
Balance at December 31, 2017	77,179	$ —
Shares issued/cancelled	—	—
Balance at December 31, 2018	77,179	$ —
Issuance of shares to VCH, L.P. as part of Recapitalization	13,523,232	$ 1
Issuance of shares to VCH, L.P for return of capital and accumulated yield	4,104,343	1
Issuance of shares to MIU holders	2,220,788	—
Shares withheld for net settlement of shares issued to MIU holders	(80,620)	—
Issuance of shares in Initial Public Offering	5,800,000	1
Issuance of vested shares	28,061	—
Balance at December 31, 2019	25,672,983	$ 3

On October 28, 2011, 771.79 shares with a par value of $0.01 per share were issued at an initial subscription price of $1,000 per share. Holders of these shares are entitled to dividends as declared. As of December 31, 2019, no dividends have been declared or paid.

On April 23, 2019, the Board of Directors approved a share subdivision ("Subdivision") whereby the authorized share capital of the Company was subdivided from 5,000,000 shares having a par value of $0.01 per share into 500,000,000 shares with a par value of $0.0001 per share. The Board resolution was made effective in accordance with Cayman law on June 6, 2019. As a result of the Subdivision, issued and outstanding shares for all periods presented increased from 771.79 to 77,179 shares. Earnings per share as calculated and shown throughout has also been recalculated with the revised issued and outstanding shares.

Just prior to the IPO, the Company effected the Recapitalization, which comprised (i) an increase in the authorized and outstanding shares held by VCH, L.P. and (ii) an exchange of the vested share-based compensation awards held by the Company's employees for its shares and unvested share-based compensation awards for restricted shares or restricted share units issued by the Company, in each case on a value-for-value basis. As part of the Recapitalization, VCH, L.P. determined that the unreturned capital and accumulated yield payable to holders of Class A Units under the VCH, LPA will be settled in the form of additional shares in the Company. Based on the share-based compensation awards outstanding and unreturned capital and accumulated yield, and based on the IPO price of $12.00, the Company issued 17,627,575 shares to VCH, L.P and 2,220,788 shares to its employees and service providers, of which 80,620 shares were withheld in net settlement of amounts due. The impact of the Recapitalization does not result in issued and outstanding shares being restated for any prior period. Refer to Note 13 – Earning per share for information on how the issuance of the shares as part of the Recapitalization are reflected in earnings per share.

In June 2019, the Company issued 5,800,000 shares at a price of $12.00 per share in its IPO, which included 1,500,000 shares to it majority shareholder, VCH, L.P.

Note 13. Earnings per share

Basic net earnings (loss) per share is computed by dividing net income (loss) by the weighted-average number of shares outstanding during the period. Diluted net earnings per share is computed by giving effect to all potentially dilutive ordinary share equivalents outstanding for the period. For purposes of this calculation, share options, RSUs, and RSAs are considered to be ordinary share equivalents but are excluded from the calculation of diluted earnings (loss) per share when including them would have an anti-dilutive effect. The following table sets forth the computation of basic and diluted net earnings (loss) per share (in thousands, except for share and per share data):

	Year ended December 31,		
	2017	2018	2019
Numerator:			
Net income (loss)	$ 9,128	$ (1,513)	$ (17,601)
Denominator:			
Weighted average shares outstanding used in computing net income (loss), basic and diluted	13,600,411	13,600,411	19,741,764
Net income (loss) per share, basic and diluted	$ 0.67	$ (0.11)	$ (0.89)

The following outstanding shares of ordinary share equivalents were excluded from the computation of diluted net loss per share for the periods presented because including them would have had an anti-dilutive effect:

	Year ended December 31,	
	2018	2019
Share options	—	2,921
Restricted shares (RSUs and RSAs)	—	257
Total	—	3,178

On April 23, 2019, the Board of Directors approved the Subdivision whereby the authorized share capital of the Company was subdivided from 5,000,000 shares having a par value of $0.01 per share into 500,000,000 shares with a par value of $0.0001 per share. The Subdivision was effective in accordance with Cayman law on June 6, 2019. As a result of the Subdivision, issued and outstanding shares for all periods presented have been restated from 771.79 shares to 77,179 shares. Earnings per share as calculated and shown has been recalculated with the revised issued and outstanding shares.

Just prior to the IPO, the Company completed a Recapitalization. As part of the Recapitalization, the Company issued an additional 17,627,575 shares to VCH, L.P. which comprised 4,104,343 shares related to the unreturned capital and accumulated yield to the holder of Class A Units of VCH, L.P. and 13,523,232 shares related to the residual share of Cambium's value attributable to VCH, L.P.'s ownership after such return, based on an IPO price of $12.00. Using guidance in ASC 260, *Earnings per Share*, for purposes of calculating earnings per share, the 13,523,232 shares are retrospectively adjusted as if the exchange had occurred at the beginning of the first period of earnings per share information presented. The 4,104,343 shares issued related to the unreturned capital and accumulated yield and were issued in lieu of payment of cash to VCH, L.P. and therefore, the shares issued are not retrospectively reflected in shares outstanding in the prior periods for purposes of determining earnings per share.

Also as part of the Recapitalization, the Company issued 2,220,788 gross shares to its employees and service providers in exchange for the vested share-based compensation awards in VCH, L.P. held by them. For purposes of calculating earnings per share, the 2,220,788 shares are included in the weighted average number of shares outstanding used in the computation of the basic earnings per share only from the date on which the shares are issued, or June 28, 2019.

Note 14. Income taxes

For the years ended December 31, 2017, 2018 and 2019, income (loss) before income taxes includes the following components (in thousands):

	Years ended December 31,		
	2017	2018	2019
United States	$ 3,356	$ 3,544	$ 4,183
Foreign	6,025	(5,856)	(11,504)
Total	$ 9,381	$ (2,312)	$ (7,321)

For the years ended December 31, 2017, 2018 and 2019, the (benefit) provision for income taxes consists of the following (in thousands):

	Years ended December 31, 2017	2018	2019
Current:			
U.S. federal	$ 379	$ 200	$ 1,078
State	40	129	643
Foreign	1,047	735	1,157
Current tax provision	1,466	1,064	2,878
Deferred:			
U.S. federal	$ 3,109	$ 107	$ 380
State	340	(14)	(6)
Foreign	(5,333)	(1,956)	7,028
Deferred tax (benefit) provision	(1,884)	(1,863)	7,402
(Benefit) provision for income taxes	$ (418)	$ (799)	$ 10,280

For the years ended December 31, 2017, 2018, and 2019, differences between the income tax expense computed at the statutory U.S. federal income tax rate (35% for 2017 and 21% for 2018 and 2019) and the (benefit) provision for income taxes computed per the Company's consolidated statements of operation are summarized as follows (in thousands):

	Years ended December 31, 2017	2018	2019
Income tax expense (benefit) at federal statutory rate	$ 3,283	$ (486)	$ (1,537)
State and local income taxes net of federal benefit	373	115	540
Tax rate changes	(92)	(178)	662
Valuation allowance changes	(6,417)	(112)	9,599
Deferred tax asset adjustment related to interest	3,103	—	—
Foreign rate differential	(918)	329	369
Non-deductible interest	376	2	—
Research and development	(449)	(488)	(1,286)
Share-based compensation - excess tax benefit	—	—	2,807
Foreign derived intangible income	—	(266)	(1,166)
Other	323	285	292
(Benefit) provision for income taxes	$ (418)	$ (799)	$ 10,280

Foreign rate differential represents the non-U.S. jurisdictions. The country having the greatest impact on the tax rate adjustment line shown in the above table as "foreign rate differential" for the years ended December 31, 2017, 2018 and 2019 is the UK where the statutory rate was 19.25%, 19.0% and 19.0%, respectively.

The deferred tax assets and liabilities result from differences in the timing of the recognition of certain income and expense items for tax and financial reporting purposes.

The sources of these differences for the years ended December 31, 2018 and 2019 are as follows (in thousands):

	Years ended December 31, 2018	2019
NOL and tax credit carryforwards	$ 7,064	$ 8,466
Disallowed interest carryforwards	847	1,686
Lease liability	—	1,481
Property and equipment	368	146
Share-based compensation	—	488
Intangible assets	325	155
Other	176	73
Subtotal	8,780	12,495
Less: Valuation allowance	—	(9,599)
Net deferred tax assets	8,780	2,896
Property and equipment	(313)	—
ROU asset	—	(1,312)
Prepaid expenses and other assets	—	(635)
Other	(445)	(357)
Subtotal	(758)	(2,304)
Less: Valuation allowance	—	—
Net deferred tax liabilities	(758)	(2,304)
Total deferred tax assets, net	$ 8,022	$ 592
Deferred tax assets/liabilities included in the balance sheet are:		

	Years ended December 31, 2018	2019
Deferred tax assets - non-current	$ 8,022	$ 929
Deferred tax liabilities - non-current	—	337
Total deferred tax assets, net	$ 8,022	$ 592

For the years ended December 31, 2018 and 2019, the following table reflects the activity in the Company's valuation allowance on deferred tax assets (in thousands):

	Years ended December 31, 2018	2019
Beginning balance	$ 112	$ —
(Release) increase of valuation allowance	(112)	9,599
Ending balance	$ —	$ 9,599

In assessing the realizability of deferred tax assets, the Company considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the period in which those temporary differences become deductible. The Company considers projected future taxable income, reversing taxable temporary differences, carryback opportunities, and tax-planning strategies in making this assessment.

Management assesses the available positive and negative evidence to estimate if sufficient future taxable income will be generated to utilize the existing deferred tax assets before they otherwise expire. In evaluating the recoverability of its deferred tax assets, a significant piece of negative evidence evaluated was the cumulative loss incurred over the three-year period ended December 31, 2019. Cumulative losses are objective evidence that limit the ability to consider other subjective evidence such as the Company's projections for future growth. The amount of the deferred tax asset considered realizable, however, could be adjusted if estimates of future taxable income during the carryforward period are reduced or increased or if objective negative evidence in the form of cumulative losses is no longer present and additional weight may be given to subjective evidence such as the Company's projections for growth.

As of December 31, 2018, the Company's deferred tax assets were primarily the result of UK net operating loss ("NOL"), tax credit carryforwards from the UK and U.S., and the UK corporate interest reduction. For the year ended December 31, 2018, the Company recorded a change in its valuation allowance of $0.1 million on the basis of management's assessment of the amount of its deferred tax. The $0.1 million change in its valuation allowance comprised a change in judgement on the ability to utilize beginning deferred tax assets in future years and the realization of benefits of operation loss carryforward utilized during 2018.

For the year ended December 31, 2019, the Company recorded a change in its valuation allowance of $9.6 million on the basis of management's reassessment of the amount of its deferred tax assets (NOL and research and development credits) that are more likely than not to be realized. As a result of a 3-year cumulative loss analysis, there was sufficient objective evidence that UK cumulative losses over the recent 3-year period for the years ended December 31, 2017, 2018 and 2019 were strong negative and objective evidence that sufficient future income would not be generated to utilize its deferred tax assets. Consequently, the Company established a valuation allowance against its deferred tax asset to income tax expense by $9.3 million. Additionally, during 2019, the Company identified a state research and development tax credit benefit in the state of California, which is only available to offset actual tax liabilities, that is in excess of the amount reasonably expected to be utilized over the next five years. As such, the Company established a valuation allowance against an additional $0.3 million of its deferred tax asset to income tax expense.

The Company has gross income tax NOL carryforwards related to its international operations. For the year ended December 31, 2018, the NOL carryforward was approximately $30.4 million, of which $30.1 million has an indefinite life. For the year ended December 31, 2019, the NOL carryforward was approximately $38.3 million, of which $38.0 million has an indefinite life. The Company has recorded a deferred tax asset of $5.8 million related to NOL as of December 31, 2018. The Company has recorded a deferred tax asset of $6.7 million related to NOL as of December 31, 2019. The Company's gross NOL carryforwards expire as follows:

	Years ended December 31,	
	2018	**2019**
Unlimited carryforward	$30.1 million	$38.0 million
10+ year carryforward	$0.3 million	$0.3 million

The Company has tax credit carryforwards related to research and development. For the year ended December 31, 2018, the carryforward was approximately $1.3 million, of which $1.1 million has an indefinite life and $0.2 million that expires in 2038. For the year ended December 31, 2019, the carryforward was approximately $1.7 million, of which $1.7 million has an indefinite life. The Company's research and development tax credit carryforwards and their expiration are as follows:

	Years ended December 31,	
	2018	**2019**
Unlimited carryforward	$1.1 million	$1.7 million
10+ year carryforward	$0.2 million	—

The Company has gross corporate interest restriction ("CIR") disallowance carryforwards related to it UK operations. For the year ended December 31, 2018, the CIR carryforward was approximately $4.7 million, which has an indefinite life. For the year ended December 31, 2019, the CIR carryforward was approximately $9.9 million, which has an indefinite life. The Company has recorded a deferred tax asset of $1.7 million related to the CIR disallowance as of December 31, 2019. The Company's gross carryforwards expire as follows:

	Years ended December 31,	
	2018	**2019**
Unlimited carryforward	$4.7 million	$9.9 million

The Company files income tax returns in the U.S. federal jurisdiction, various state and local jurisdictions and many foreign jurisdictions. The U.S., UK, and India are the main taxing jurisdictions in which the Company operates. Open tax years subject to audit vary depending on the tax jurisdiction. In the U.S., the Company is no longer subject to U.S. federal income tax examinations by tax authorities for years before 2016. In the UK, the tax returns that are open are for the tax years 2017 and 2018. In India, the tax returns that are open are for India assessment years 2013 through 2019.

The Company believes its tax positions comply with applicable tax law and intends to vigorously defend its position. However, differing positions on certain issues could be upheld by tax authorities, which could adversely affect the Company's financial condition and results of operations. The Company does not have any unrecognized tax positions as of December 31, 2018 and 2019.

In 2019, the Company recorded compensation expense related to is management incentive compensation plan upon the completion of its IPO, which was considered a triggering event for such recognition. The Company has reviewed the tax treatment in the various jurisdictions in which it operates and has reflected the associated impacts to taxable income and income tax expense. These expenses and deductions have had a significant impact on the Company's determination to record a valuation allowance in the same period as the triggering event during 2019.

The Company recorded income tax benefit of $(0.4) million, $(0.8) million and income tax expense of $10.3 million for the years ended December 31, 2017, 2018 and 2019, with an effective tax rate of (4.5)%, 34.6 % and (140.4) %, respectively. The Company's effective tax rate for the year ended December 31, 2017 differed from the U.S. statutory rate primarily due to the release of a valuation allowance against deferred tax assets, deferred tax asset adjustments related to interest, and the foreign tax rate differential. The Company's effective tax rate for the year ended December 31, 2018 differed from the U.S. statutory rate primarily due to a benefit on research and development credit among other smaller tax adjustments. The Company's effective tax rate for the year ended December 31, 2019 differed from the U.S. statutory rate primarily due to the recognition of a valuation allowance against its UK deferred tax assets, taxation of pre-IPO MIU equity awards, tax benefits on research and development, and tax benefits on foreign derived intangible income.

Note 15. Commitments and contingencies

In accordance with ASC 460, *Guarantees*, the Company recognizes the fair value for guarantee and indemnification arrangements it issues or modifies, if these arrangements are within the scope of the interpretation. In addition, the Company must continue to monitor the conditions that are subject to the guarantees and indemnifications in order to identify if a loss has incurred. If the Company determines it is probable that a loss has occurred, then any such estimated loss would be recognized under those guarantees and indemnifications and would be recognized in the Company's consolidated statements of operations and corresponding consolidated balance sheets during that period.

Indemnification

The Company generally indemnifies its distributors, value added reseller and network operators against claims brought by a third party to the extent any such claim alleges that the Company's product infringes a patent, copyright or trademark or violates any other proprietary rights of that third party. Although the Company generally tries to limit the maximum amount of potential future liability under its indemnification obligations, in certain agreements this liability may be unlimited. The maximum potential amount of future payments the Company may be required to make under these indemnification agreements is not estimable.

The Company indemnifies its directors and officers and select key employees, including key employees serving as directors or officers of the Company's subsidiaries, for certain events or occurrences, subject to certain limits, while the director or officer is or was serving at the Company's request in such capacity. The term of the indemnification period is for the director's or officer's term of service. The Company may terminate the indemnification agreements with its directors, officers or key employees upon the termination of their services as directors or officers of the Company or its subsidiaries, or the termination of activities for which indemnification has been provided, but termination will not affect claims for indemnification related to events occurring prior to the effective date of termination. The maximum amount of potential future indemnification is unlimited; however, the Company has a director and officer insurance policy that limits its exposure. The Company believes the fair value of these indemnification agreements is minimal.

Warranties

The Company provides a one-year and three-year standard warranty on most hardware products and records a liability for the estimated future costs associated with potential warranty claims. The Company's responsibility under its standard warranty is the repair or replacement of in-warranty defective product, or to credit the purchase price of the defective product, at its discretion, without charge to the customer. The warranty costs are reflected in the Company's consolidated statements of operations within cost of revenues. The Company's estimate of future warranty costs is largely based on historical experience factors including product failure rates, material usage, and service delivery cost incurred in correcting product failures. The Company also offers for purchase an extended warranty on most of its products; a limited lifetime warranty on select hardware products; and an all risks advance replacement warranty covering additional types of equipment damage not covered by its standard warranty.

Legal proceedings

Third parties may from time to time assert legal claims against the Company. Except as set forth below, there is no pending or threatened legal proceedings to which the Company is a party to, and in the Company's opinion, is likely to have a material adverse effect on its financial condition or results of operations.

On August 7, 2018, Ubiquiti Networks, Inc. filed a lawsuit in the United States District Court, Northern District of Illinois, against the Company, two of its employees, one of its distributors and one of its end users. The complaint alleged that the Company's development of and sales and promotion of its Elevate software as downloaded on a Ubiquiti device violates the Computer Fraud and Abuse Act and Illinois Computer Crimes Prevention Law, the Digital Millennium Copyright Act and the Copyright Act and constitutes misrepresentation and false advertising and false designation of origin in violation of the Lanham Act and state competition laws, breach of contract, tortious interference with contract and unfair competition, and trademark infringement and common law misappropriation. The complaint also asserted additional claims against all defendants alleging that the development and sales of Elevate violated the Racketeer Influenced and Corrupt Organizations Act. On May 22, 2019, the Court issued its order dismissing Ubiquiti's complaint without prejudice. On June 18, 2019, Ubiquiti filed its First Amended Complaint (FAC). The FAC made substantially the same claims against the same parties with the exception that the FAC does not include claims for violation of the Illinois Computer Crime Prevention Law, Infringement of Registered Trademarks, False Designation of Origin, and Common Law Trademark Misappropriation that were included in the initial complaint. The Company filed a motion to dismiss the FAC on July 10, 2019. On November 14, 2019 the Court issued an order denying its motion to dismiss. The Court ordered that fact discovery will close on August 18, 2020 and that dispositive motions must be filed prior to December 22, 2020. The Court referred the case to a magistrate judge for a potential settlement conference. The Company believes Ubiquiti's claims are without merit and plans to vigorously defend against these claims; however, there can be no assurance that it will prevail in the lawsuit. The Company cannot currently estimate the possible loss or range of losses, if any, that it may experience in connection with this litigation.

Note 16. Segment information and revenues by geography

The Company's chief operating decision maker ("CODM") is its Chief Executive Officer. The Company's CODM reviews financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. Accordingly, the Company determined that it operates as one operating segment and one reporting unit.

Revenues by product category were as follows (in thousands, except percentages):

	Years ended December 31,					
	2017		2018		2019	
Point-to-MultiPoint	$ 142,000	66%	$ 146,621	61%	$ 156,157	59%
Point-to-Point	56,130	26%	71,678	30%	71,618	27%
Wi-Fi	14,620	6%	19,571	8%	35,678	13%
Other	3,921	2%	3,892	1%	3,575	1%
Total Revenues	$ 216,671	100%	$ 241,762	100%	$ 267,028	100%

The Company's products are predominately distributed through a third-party logistics provider in the United States, Netherlands and China. The Company has determined the geographical distribution of product revenues based upon the ship-to destinations.

Revenue by geography were as follows (in thousands, except percentages):

	Years Ended December 31,					
	2017		2018		2019	
North America	$ 100,676	47%	$ 108,884	45%	$ 122,565	46%
Europe, Middle East and Africa	68,208	31%	75,503	31%	85,930	32%
Caribbean and Latin America	26,962	12%	29,833	12%	31,767	12%
Asia Pacific	20,825	10%	27,542	12%	26,766	10%
Total Revenues	$ 216,671	100%	$ 241,762	100%	$ 267,028	100%

The following countries had revenues greater than 10% of total revenues:

- United States - $90.9 million for 2017, $101.5 million for 2018 and $121.3 million for 2019
- Italy - $39.9 million for 2017, $36.8 million for 2018 and $38.4 million for 2019

Customers with an accounts receivable balance of 10% or greater of total accounts receivable and customers with net revenues of 10% or greater of total revenues are presented below for the periods indicated:

	Percentage of Revenues Years Ended December 31,			Percentage of Accounts Receivable As of December 31,	
	2017	2018	2019	2018	2019
Customer A	15%	16%	16%	16%	20%
Customer B	15%	12%	11%	*	*
Customer C	11%	*	*	*	*

* denotes percentage is less than 10%

Note 17. Revenue from contracts with customers

In accordance with ASC 606, *Revenue From Contracts with Customers*, the Company recognizes revenue to reflect the transfer of control of promised products or services to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those products and services. Refer to Note 16 - Segment Information, for further details, including disaggregation of revenue based on product category and geographic location.

Contract Balances

The following table summarizes contract balances as of December 31, 2018 and December 31, 2019:

	December 31, 2018	December 31, 2019
Trade accounts receivable, net of allowance for doubtful accounts	$ 59,797	$ 58,254
Deferred revenue - current	2,770	7,430
Deferred revenue - noncurrent	1,541	4,852
Refund liability	$ 1,810	$ 2,223

Trade accounts receivable include amounts billed and currently due from customers. Amounts are billed in accordance with contractual terms and are recorded at face amount less an allowance for doubtful accounts.

Deferred revenue consists of amounts due or received from customers in advance of the Company satisfying performance obligations under contractual arrangements and generally relates to extended warranty on hardware products. Deferred revenue is classified as current or noncurrent based on the timing of when revenue will be recognized. The changes in deferred revenue were due to normal timing differences between the Company's performance and the customers' payment, other than the $7.5 million of deferred revenue assumed as part of the Xirrus acquisition completed in August 2019. As noted in Note 2 – Business Combinations, this amount is currently considered provisional as the purchase price allocation is not complete as of December 31, 2019.

The refund liability is the estimated amount expected to be refunded to customers in relation to product exchanges made as part of the Company's stock rotation program and returns that have been authorized, but not yet received by the Company. It is included within other current liabilities in the consolidated balance sheets.

Remaining performance obligations

Remaining performance obligations represent the revenue that is expected to be recognized in future periods related to performance obligations included in a contract that are unsatisfied, or partially satisfied, as of the end of a period. As of December 31, 2018 and 2019, deferred revenue (current and noncurrent) of $4.3 million and $12.3 million, respectively, represents the Company's remaining performance obligations, of which $2.8 million and $7.4 million, respectively, is expected to be recognized within one year, with the remainder to be recognized thereafter.

Revenue recognized during the year ended December 31, 2019 which was previously included in deferred revenues as of December 31, 2018 was $2.8 million.

Cost to obtain a contract

Sales commissions are incremental costs of obtaining a contract. The Company has elected to recognize these expenses as incurred due to the amortization period of these costs being one year or less.

Note 18. Leases

The Company adopted ASC 842 on January 1, 2019 using the optional transition method for all leases existing at January 1, 2019, the date of initial application.

The Company has operating leases for offices, vehicles, and office equipment. Leases with a term of 12 months or less are not recorded on the consolidated balance sheets, and are expensed on a straight-line basis over the lease term.

ROU assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at the commencement date. The Company's lease payments are typically fixed or contain fixed escalators. The Company's leases typically include certain lock-in periods and renewal options to extend the leases, but it does not consider options to extend the lease it is not reasonably certain to exercise. The Company elected the practical expedient to not separate the lease and non-lease components of its leases and currently has no leases with options to purchase the leased property.

The components of lease expense were as follows and are included in general and administrative expense (in thousands):

	Year Ended December 31, 2019
Operating lease cost	$ 2,410
Short-term lease cost	183
Variable lease costs	406
Total lease expense	$ 2,999

Rent expense totaled $1.4 million and $2.3 million in 2017 and 2018, respectively.

Supplemental balance sheet information related to leases were as follows (in thousands, except lease term and discount rate):

	Balance Sheet Caption	December 31, 2019
Operating leases:		
Operating lease assets	Operating lease assets	$ 6,872
Current lease liabilities	Other current liabilities	$ 2,125
Noncurrent lease liabilities	Noncurrent operating lease liabilities	$ 5,335
Weighted average remaining lease term (years):		
Operating leases		3.98
Weighted average discount rate:		
Operating leases		8.50%

Supplemental cash flow information related to leases were as follows (in thousands):

	Year Ended December 31, 2019
Supplemental cash flow information:	
Cash paid for amounts included in the measurement of lease liabilities	$ 2,461

The Company's lease terms range from one to seven years and may include options to extend the lease by one to four years.

Maturities on lease liabilities at December 31, 2019 were as follows (in thousands):

		Operating leases
2020	$	2,682
2021		2,468
2022		1,361
2023		1,305
2024		554
Thereafter		468
Total lease payments		8,838
Less: interest		1,378
Present value of lease liabilities	$	7,460

Future payments under operating lease agreements accounted for under ASC 840, *Leases*, as of December 31, 2018 were as follows (in thousands):

		2019		2020		2021		2022		2023		Thereafter		Total
Operating leases	$	2,409	$	2,418	$	2,203	$	1,307	$	1,267	$	1,072	$	10,676

As of December 31, 2019, the Company does not have any additional leases for new office facilities that have not yet commenced.

Note 19. Related party transactions

The Company follows ASC 850, *Related Party Disclosures*, for the identification of related parties and disclosure of related party transactions. A party is considered to be related to the Company if the party directly or indirectly or through one or more intermediaries, controls, is controlled by, or is under common control with the Company. Related parties also include principal owners of the Company, its management, members of the immediate families of principal owners of the Company and its management and other parties with which the Company may deal.

VCH, L.P., the ultimate controlling party, provided funding to the Company in the form of CPECs, as described in Note 8 – Loan from Sponsor and capital contribution, and contributed capital of $62.5 million and $2.0 million, respectively. On July 31, 2017, the Company redeemed the CPECs and VCH, L.P. made a non-cash capital contribution to the Company of $88.4 million, including principal of $62.5 million and accrued interest of $25.9 million. On December 21, 2017, the Company made a cash return of contributed capital to VCH, L.P. in the amount of $65.7 million.

In connection with the Company's execution of the Waiver and First Amendment to Amended and Restated Credit Agreement dated November 21, 2018 (Refer to Note 7– Debt), Vector Capital IV, L.P., an affiliate of the general partner of the Company's sole shareholder, executed a Limited Guaranty agreement whereby it has agreed to guarantee the Company's Tranche B loan up to a maximum of the lesser of: (i) $25.0 million and (ii) an amount equal to (a) 1.10 multiplied by (b) an amount equal to the then aggregate principal amount of the Tranche B loan.

In connection with the Company's execution of the Third Amendment to Amended and Restated Credit Agreement dated June 28, 2019 (Refer to Note 7 – Debt), Vector Capital IV, L.P., an affiliate of the general partner of the Company's sole shareholder was relieved of its Limited Guaranty agreement.

For the years ended December 31, 2018 and 2019, Vector Capital Management, LP, an entity related to VCH, L.P., charged $0.5 million and $0.3 million, respectively, for management and oversight fees. In addition to the management and oversight fees, in 2017, Vector Capital Management, LP charged the Company $2 million in management fees in connection with the Company's $90 million debt financing as discussed in Note 7 – Debt. Amounts due to Vector Capital Management, LP at December 31, 2018 and 2019 were $5.6 million and $0.0 million, respectively, and were included as Payable to Sponsor in the Company's consolidated balance sheets. On July 3, 2019, the Company paid $5.6 million to Vector Capital Management from the net proceeds from the Company's IPO. In connection with the IPO and the payment of these fees, the Vector Capital Management Agreement is terminated.

In connection with the Recapitalization and upon consummation of the Company's IPO, the Company issued shares to VCH, L.P. representing the amount of unreturned capital and accumulated yield payable to holder of Class A Units of VCH, plus the residual shares of the Company's value attributable to VCH's ownership after such return, based on the IPO price of $12.00 per share. After completion of the Recapitalization and the offering, the Company is neither party to nor subject to any obligations under the VCH LPA.

Note 20. Quarterly financial data (unaudited)

The following table presents the Company's unaudited consolidated statements of operations data for each of the eight quarters during the years ended December 31, 2018 and 2019. This information has been presented on the same basis as the audited consolidated financial statements included in this report, and all necessary adjustments, consisting only of normal recurring adjustments, have been included in the amounts below to state fairly the unaudited quarterly results when read in conjunction with the audited consolidated financial statements and related notes.

	Three months ended				Year ended
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	December 31, 2018
	(unaudited)				
Revenues	$ 58,453	$ 61,019	$ 58,981	$ 63,309	$ 241,762
Cost of revenues	30,250	31,710	31,469	32,838	126,267
Gross profit	28,203	29,309	27,512	30,471	115,495
Operating expenses					
Research and development	9,385	9,688	9,810	10,034	38,917
Sales and marketing	10,419	10,066	10,805	11,368	42,658
General and administrative	4,321	4,323	5,520	4,640	18,804
Depreciation and amortization	2,370	2,338	2,448	1,609	8,765
Total operating expenses	26,495	26,415	28,583	27,651	109,144
Operating income (loss)	1,708	2,894	(1,071)	2,820	6,351
Interest expense	1,758	2,088	2,033	2,234	8,113
Other expense	231	110	116	93	550
(Loss) income before income taxes	(281)	696	(3,220)	493	(2,312)
(Benefit) provision for income taxes	(54)	171	(665)	(251)	(799)
Net (loss) income	$ (227)	$ 525	$ (2,555)	$ 744	$ (1,513)

	Three months ended				Year ended
	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019	December 31, 2019
	(unaudited)				
Revenues	$ 68,112	$ 69,151	$ 65,703	$ 64,062	$ 267,028
Cost of revenues	36,322	34,839	33,871	30,767	135,799
Gross profit	31,790	34,312	31,832	33,295	131,229
Operating expenses					
Research and development	10,482	15,189	9,895	12,126	47,692
Sales and marketing	10,218	14,227	10,363	11,445	46,253
General and administrative	5,130	13,063	5,996	5,936	30,125
Depreciation and amortization	1,281	1,227	1,449	1,901	5,858
Total operating expenses	27,111	43,706	27,703	31,408	129,928
Operating income (loss)	4,679	(9,394)	4,129	1,887	1,301
Interest expense	2,268	2,301	2,105	1,402	8,076
Other expense	134	56	61	295	546
Income (loss) before income taxes	2,277	(11,751)	1,963	190	(7,321)
Provision for income taxes	415	8,623	3	1,239	10,280
Net income (loss)	$ 1,862	$ (20,374)	$ 1,960	$ (1,049)	$ (17,601)

Note 21. Subsequent event

On February 10, 2020, the Company announced it took additional steps in connection with its previously announced corporate restructuring. The additional restructuring will only affect personnel, including contract employees, and is expected to be complete by the end of 2020. The Company will incur between $1.2 million and $1.4 million in personnel costs, including salary continuation and other benefits over the first three quarters of 2020.

COMMERCIAL SUBLEASE

Effective Date of this Agreement:	**December 1, 2019** (the "Effective Date," hereinafter defined)
This Agreement is by and between	**Agfa Corporation** ("Sublessor")
	located at 611 River Drive Center 3, Elmwood Park, NJ 07407
AND	**Cambium Networks, Inc.** ("Sublessee")
	located at 3800 Golf Road, Suite 360, Rolling Meadows, IL 60008

Background

A. This is an agreement (the "Sublease") to sublet real property according to the terms specified below.

B. The Sublessee and Sublessor are herein referred to individually as a "Party" and collectively as the "Parties."

IN CONSIDERATION OF the Sublessor subletting and the Sublessee renting the Premises (hereinafter defined), both Parties agree to keep, perform and fulfill the promises, conditions and agreements below:

1. FACILITY AND PREMISES

Sublessor is the tenant by virtue of a lease wherein Thousand Oaks Arbors LLC was the original landlord, and subsequently assigned its interest to : LAX Sixth Avenue Arbors Equities LLC, a Delaware limited liability company, and LAX Arbors LLC, a Delaware limited liability company (collectively "Landlord") and wherein the lease was amended by First Amendment to Lease dated as of June 12, 2013, and Second Amendment to Lease dated as of August 21, 2018 (collectively, the "Master Lease"). The facility consists of an office building located at 2545 W. Hillcrest Dr., Thousand Oaks, CA. Those certain premises known as Suite 220 located on the second floor of the Facility, consisting of approximately 8,722 square feet, (the "Premises") which, for purposes of this Sublease, Sublessor hereby leases to the Sublessee. A layout of the Premises is attached hereto as Exhibit A.

This Sublease is contingent upon Landlord's consent with the sublease of the Premises to Sublessee. In the event Landlord does not consent with the sublease of the Premises, this Sublease shall be null and void.

2. TERM AND TERMINATION

The term (the "Term") begins at 12:01 a.m. PST on the Effective Date and ends at 12:00 a.m. PST on January 31, 2022 (the "End Date"). The Term may be extended beyond the End Date by mutual agreement by the Parties provided that Sublessee gives written notice of its intent to extend the Term to Sublessor no later than December 31, 2020 (the "Extended Term").

3. PAYABLE RENT AND SECURITY DEPOSIT

The Base Rental Rate payable by Sublessee to Sublessor is agreed as follows:

Term (Months)	Date	Base Rent per RSF per month	Monthly Base Rent
1	12/1/2019	$2.16	$18,839.52
2	1/1/2020	$0.00	free
3	2/1/2020	$2.16	$14,221.52 (partial month free)
4	3/1/2020	$0.00	free
5	4/1/2020	$2.16	$18,839.52
6	5/1/2020	$2.16	$9,419.76 (1/2 month free)

7	6/1/2020	$2.16	$18,839.52
8	7/1/2020	$0.00	free
9	8/1/2020	$2.23	$19,450.06
10	9/1/2020	$2.23	$19,450.06
11	10/1/2020	$0.00	free
12	11/1/2020	$2.23	$19,450.06
13	12/1/2020	$2.23	$19,450.06
14	1/1/2021	$0.00	free
15	2/1/2021	$2.23	$19,450.06
16	3/1/2021	$2.23	$19,450.06
17	4/1/2021	$2.23	$19,450.06
18	5/1/2021	$2.23	$9,725.03 (1/2 month free)
19	6/1/2021	$2.23	$19,450.06
20	7/1/2021	$2.30	$10,016.78 (1/2 month free)
21	8/1/2021	$2.30	$20,033.56
22	9/1/2021	$2.30	$10,016.78 (1/2 month free)
23	10/1/2021	$2.30	$20,033.56
24	11/1/2021	$2.30	$10,016.78 (1/2 month free)
25	12/1/2021	$2.30	$20,033.56
26	1/1/2022	$2.30	$10,016.78 (1/2 month free)

Amounts are due and payable beginning on the Effective Date and the first day of each month thereafter during the Term. Sublessee shall pay a security deposit to Sublessor in the amount of $10,016.78 due and payable on the Effective Date.

4. NOTICES AND RECORDS

Any notice that either party may give, or is required to give, shall be given by mailing the same, postage prepaid, to the Sublessor at the address in the introductory paragraph of this Agreement, or the Sublessee at the address in the introductory paragraph of this Agreement, or at such other places as may be designated by the Parties in writing from time to time.

5. TERMINATION

a) ~~Sublessor may terminate the lease without cause by giving written notice to Sublessee at least thirty (30) days prior to the date of termination~~. /s/ SC 12/19/19 /s/ DR 01/02/20

b) Upon the expiration or earlier termination of this Agreement, Sublessee shall pay all fees due and payable to Sublessor, and shall return the Premises to Sublessor in good repair, condition and working order, ordinary wear and tear resulting from proper use thereof alone excepted. Upon the expiration or termination of this Agreement, Sublessee shall return all badges, keys, any access keys and the like to Sublessor.

6. USE

a) Uses Permitted. The Sublessee may occupy and use the Premises for research and development, general office and administrative functions. The Sublessee may occupy or use the Premises in this manner during the normal business hours. The Premises shall be for no other purpose. The Sublessor represents that the Premises may lawfully be used for such purpose, which representation is a material term of the Sublease on which Sublessee relies in entering into the Sublease. Sublessee at its sole expense shall obtain all licenses or permits which may be required for its business within the terms of this Sublease, or for the making of approved repairs, alterations or improvements.

b) Sublessee shall not use the Premises or permit the use of any dangerous, noxious, or offensive trade or business, nor cause or maintain any nuisance upon the Premises and shall comply with all federal, state and local environmental laws and regulations now in force, or that may hereafter be in force. Sublessee shall give Sublessor immediate notice of any failure of Sublessee to comply with any such law or regulation.

c) Sublessee may use the existing Supplemental HVAC system under the Master Lease. Sublessee shall be responsible for all preventative maintenance and repairs by hiring a third party maintenance service at its sole cost and expense.

d) Sublessee shall have use of the existing furniture in the Premises.

e) The use and occupation by the Sublessee of the Premises shall include the right to use in common with others entitled thereto the common area, subject to the terms and conditions of this Sublease and reasonable rules and regulations for the use thereof, as prescribed from time to time by the Facility owner. The term "Common Areas" as used in this Sublease shall mean all facilities furnished in the Facility and designated for the general use, in common with other occupants of the Facility, including Sublessee, its officers, agents, employees, and customers, which facilities may include, but are not limited to, walkways, elevators, landscaped areas and other similar facilities available for common use which may from time to time exist.

7. ALTERATIONS

The Sublessee shall not, without first obtaining the written consent of the Sublessor or Landlord, as applicable, make any alterations, additions, or improvements, in, to or about the Premises.

8. DUTIES AND PERFORMANCE OF SUBLESSEE

a) During the term of this Sublease and for all periods subsequent for obligations which have arisen prior to the termination of this Sublease, Sublessee does hereby expressly assume and agree to perform and comply with, for the benefit of Sublessor and Lessor, each and every obligation of Sublessor under the Master Lease to the extent such obligations apply to the Premises.

b) Sublessee shall hold Sublessor free and harmless from all liability, judgments, costs, damages, claims or demands, including reasonable attorneys' fees, arising out of Sublessee's failure to comply with or perform Sublessee's obligations.

c) <u>Sublessee Improvements</u>. Sublessee shall not make any improvements on the Premises.

7. ASSIGNMENT & SUBLETTING

The Sublessee shall not assign this Sublease or sublet any portion of the Premises without prior written consent of the Sublessor. Consent to subleasing shall not be unreasonably withheld unless it is based upon refusal by the Owner to give consent, in the Owner's sole judgment. Any such assignment or subletting without consent shall be void.

8. INDEMNIFICATION

Sublessee hereby agrees to indemnify, defend and hold Sublessor harmless from any and all third-party claims, damages, liabilities or expenses arising out of or related to (i) Sublessee's use of the Premises or the Common Areas, (ii) any and all claims arising from any breach or default in the performance of any obligation of Sublessee, and (iii) any act, omission or negligence of Sublessee, its agents or its employees, except in each case to the extent arising out of the negligence, breach, willful misconduct, or other action or inaction of Sublessor or any of its agents or employees. Sublessee further releases Sublessor from liability for any damages sustained by Sublessee or any other person claiming by, through or under Sublessee due to repair of the Premises, the Facility, or any part thereof, to the extent that repairing same is Sublessee's obligation hereunder.

9. INSURANCE

Sublessee shall maintain at its sole expense during the Term hereof public liability insurance covering the Premises in an amount of $1,000,000.00 for injury or death to any one person; $2,000,000.00 for injury and/or death to any number of persons in any one accident; and property damage insurance in an amount of

$1,000,000.00. Sublessee will cause such insurance policies to name Sublessor as an additional insured on a primary and non-contributory basis with respect to Sublessee's liabilities assumed under the indemnification provisions of Section 8 of this Sublease. Sublessee shall also keep in force fire and extended coverage insurance for the full replacement value of Sublessee's improvements and Sublessee's property, including, but not limited to, inventory, trade fixtures, furnishings and other personal property. Sublessee will cause such insurance policies to name of Sublessor as additional insureds and to be written so as to provide that the insurer waives all right of recovery by way of subrogation against Sublessor in connection with any loss or damage covered by the policy. In addition, Sublessee shall keep in force workman's compensation or similar insurance to the extent required by law. Sublessee shall deliver said policies or certificates thereof to Sublessor at least ten (10) days prior to the commencement of the Term. Should Sublessee fail to effect the insurance called for herein Sublessor may, at its sole option, procure said insurance and pay the requisite premiums, in which event, Sublessee shall pay all sums so expended to Sublessor, as additional rent following invoice. Each insurer under the policies required hereunder shall agree by endorsement on the policy issued by it or by independent instrument furnished to Sublessor that it will give Sublessor thirty (30) days prior written notice before the policy or policies in question shall be altered or cancelled.

10. SUBLESSOR'S REMEDIES UPON DEFAULT

If the Sublessee defaults in the performance of any of the covenants or conditions of this Agreement, the Sublessor may give the Sublessee written notice of such default and if the Sublessee does not cure any such default within thirty (30) business days after the giving of such notice (or, if such other default is of such a nature that it cannot be completely cured within such period, then within a reasonable time), then the Sublessor may terminate this Sublease by giving not less than thirty (30) calendar days' written notice to the Sublessee. On the date specified in such notice the Term of this Sublease shall terminate, and the Sublessee shall then quit and surrender the Premises to the Sublessor. If this Sublease shall have been so terminated by the Sublessor, the Sublessor may at any time thereafter resume possession of the Premises by any lawful means and remove the Sublessee or other occupants and their effects.

11. WAIVER

No failure of the Sublessor or the Sublessee to enforce any term of this Agreement shall be deemed to be a waiver.

12. HEIRS, ASSIGNS & SUCCESSORS

This Agreement is binding upon and inures to the benefit of the heirs, assigns and successors in interest to the parties.

13. REPRESENTATION ON AUTHORITY OF PARTIES/SIGNATORIES

Each person signing this Agreement represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Agreement on behalf of their respective corporation, sole proprietorship, partnership or other entity. Each Party represents and warrants to the other that the execution and delivery of the Agreement and the performance of such Party's obligations hereunder have been duly authorized and that the Agreement is a valid and legal agreement binding on such Party and enforceable in accordance with its terms.

14. SUBORDINATION

This Sublease is and shall be subordinated to all existing and future liens and encumbrances against the property, including the Master Lease. If any proceedings are brought for foreclosure, or in the event of the exercise of the power of sale under any mortgage or deed of trust made by the Sublessor covering the Subleased Premises, the Sublessee shall recognize such purchaser as the Sublessor under this Sublease.

15. SEVERABILITY

If any provision of this Sublease is found invalid or unenforceable under judicial decree or decision, the remainder shall remain valid and enforceable according to its terms. Without limiting the previous, it is expressly understood and agreed that each and every provision of this Sublease that provides for a limitation of liability, disclaimer of warranties, or exclusion of damages is intended by the Parties to be severable and independent of any other provision and to be enforced as such. Further, it is expressly understood and agreed that if any remedy under this Sublease is determined to have failed of its essential purpose, all other limitations of liability and exclusion of damages set forth in this Agreement shall remain in full force and effect.

16. GOVERNING LAW AND JURISDICTION

This Sublease shall be governed by the laws of the State where the Facility is located. Any claims, legal proceeding or litigation arising in connection with this Sublease will be brought solely in state and federal courts of the State of New Jersey, and the Parties consent to the jurisdiction of such courts.

17. LIMITATION OF LIABILITY

NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR INDIRECT, SPECIAL, INCIDENTAL AND/OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS OR DAMAGES RESULTING FROM BUSINESS INTERRUPTION WHETHER BASED IN WARRANTY, CONTRACT, TORT, OR ANY OTHER LEGAL THEORY, AND WHETHER OR NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NEITHER PARTY SHALL BE LIABLE FOR LOST PROFITS OF ANY NATURE OR CHARACTER.

18. CONSTRUCTION OF CONTRACT

This Sublease was negotiated pursuant to an arms' length transaction and is the product of joint drafting. Each party acknowledges that it has had sufficient opportunity to consult with attorneys concerning the terms of this Sublease before singing it. This Sublease will not be construed against either party more strictly than against the other party.

19. COUNTERPARTS

This Sublease may be executed on any number of counterparts with the same effect as if the signatures were on the same instrument.

20. SUBJECT TO MASTER LEASE

The sublease will in all respects be subject to the terms and conditions of the Master Lease, and Sublessee will be bound by all of the provisions applicable to "Tenant" thereunder as to the Sublease Premises, except for those portions that are by their express terms personal to Sublessor or that contradict provisions in this Sublease.

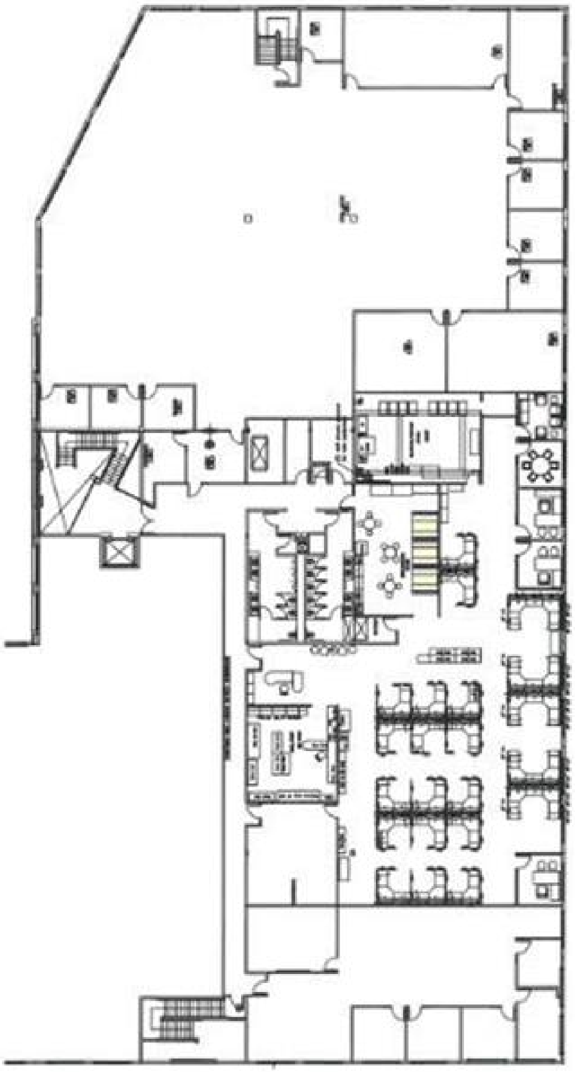
[*signature page follows on next page*]

Understood, Agreed & Approved

We have carefully reviewed this contract and agree to and accept all of its terms and conditions. We are executing this Agreement as of the Effective Date above.

Sublessee: Cambium Networks, Inc	Sublessor: Agfa Corporation
/s/ STEPHEN CUMMING	/s/ DAVID RITTER
By	By
Stephen Cumming	David Ritter
Name	Name
CFO	CFO
Title	Title
December 13, 2019	December 13, 2019
Date	Date

Exhibit A



{00532541 - 2}

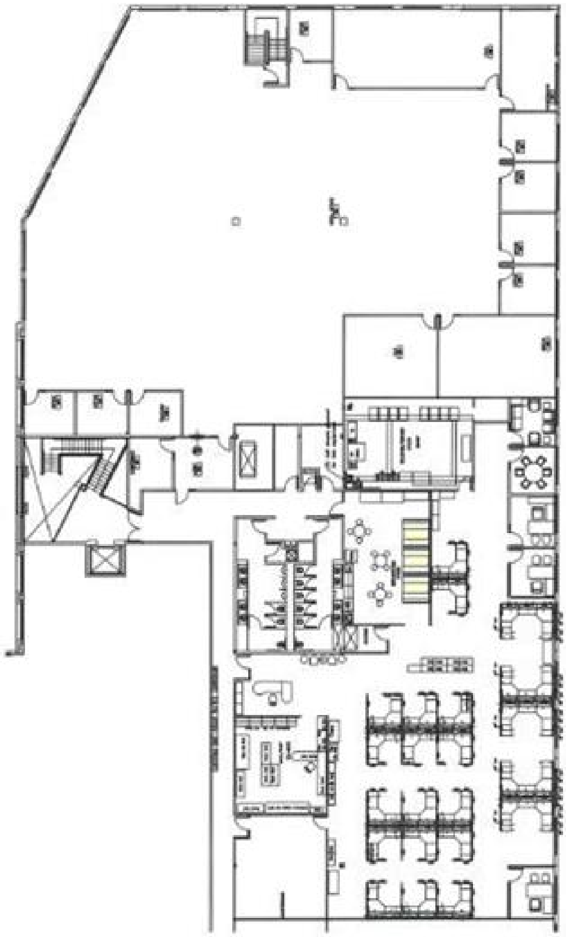


Exhibit 10.32

June 14, 2018

Stephen Cumming
c/o Cambium Networks, Inc.
3800 Golf Road, Ste 360
Rolling Meadows, IL 60008

Dear Stephen,

I am pleased to extend you an offer of employment with Cambium Networks (“Cambium” or the “Company”) as its Chief Financial Officer, commencing July 9, 2018. Your principal place of employment will be San Jose, California, with travel commensurate with your position. This letter (this “Agreement”) outlines certain terms of your employment should you choose to accept this offer.

- **Base Salary.** You will receive an annualized base salary of $350,000, paid in accordance with the Company’s standard payroll practices (currently paid biweekly), subject to applicable withholding and other required deductions.

- **Annual Cash Incentive Bonus.** You will be eligible to receive an annual cash incentive bonus based upon the achievement of annual performance goals or objectives established and measured by the Compensation Committee (the “Committee”) of the Company’s Board of Directors (the “Board”) in its sole discretion. You shall have a target annual incentive bonus opportunity equal to 60% of your annual base salary, payable in accordance with the Company’s annual cash incentive bonus program, as may be amended from time to time (but in no event shall any actual bonus be paid later than March 15th of the calendar year immediately following the year for which such compensation is earned). Actual bonus awards may pay below or above your target opportunity, including a zero payout, based on your and the Company’s achievement of the applicable performance goals or objectives. For the 2018 performance year, you will receive a guaranteed payout equal to your target opportunity, but prorated to reflect the period during the year in which you were employed by the Company, provided that you remain employed with the Company through the payment date of the 2018 bonus.

Initial Equity Award. Subject to approval by the Board, you will be eligible for an equity award of 600,000 Management Incentive Units (MIUs), with the effective date of such grant to be the date of Board approval. Twenty-five percent (25%) of the MIUs shall vest on the one-year anniversary of the grant date (the “initial vesting date”) with the remaining 75% of the MIUs vesting on a monthly basis over the next 36 months following the initial vesting date, subject to your continued employment with the Company on the applicable vesting date. If, on or prior to the one-year anniversary of your commencement of employment with the Company a (l) change of control ("Change of Control") of the Company occurs whereby (i) there is a sale of all or substantially all of the assets of the Company to an entity not wholly-owned by the Company or (ii) a merger or a consolidation in which the Company is not the surviving corporation and the stockholders of the Company prior to the Change of Control do not own 50% of the outstanding voting securities of the surviving corporation. or a parent thereof, and (2) within one year following such Change of Control, your employment with the Company (a) is terminated by the Company without cause or (b) is terminated by you following a material reduction in your responsibilities (which may include, but cannot be exclusively limited to a change in title) or a change in your primary work location of more than 25 miles unless the change would move you closer to your primary residence, provided that in the case of clause (b), you provide the Company with notice of the event giving rise to your right to terminate employment within 30 days of the initial occurrence of the event, the Company has 30 days to cause such event and, if uncured, you terminate your employment within 60 days following the expiration of the cure period (collectively "Qualifying Termination"), then 50% of the MIUs granted to you under this Agreement shall vest in full. Following the expiration of such one-year period, the MIUs granted to you under this Agreement shall vest in full in the event you experience a Qualifying Termination within the one-year period following a Change of Control of the Company. You will receive the MIU award agreement following your commencement of employment with the Company.

- **Severance.** In the event your employment is terminated by the Company without cause, you will be eligible to receive 6 months of base salary continuation following your termination of employment, subject to your execution and non-revocation of a customary release of claims in favor of the Company.

- **Employee Benefits.** You will be eligible to participate in the Company's standard employee benefits including medical, dental, life, 401(k), accidental life and dismemberment, and disability benefits, as in effect from time-to-time. Further information about the Company's current benefits offerings is available in your Welcome Packet. Participation in any benefit program is not to be regarded as assurance of continued employment for any particular period of time.

- **Company Policies.** You acknowledge that during your employment with the Company you will be subject to Company policies including, without limitation, any clawback policy, insider trading policy, and stock ownership guidelines.

As a Cambium employee, you will be expected to maintain the confidentiality of all proprietary and other confidential information of the Company and, as a condition of your employment, will be asked to enter into a Confidentiality, Invention Assignment, Non-Competition, and Non-Solicitation Agreement. Among other things, it requires that you hold in confidence any proprietary information received as an employee of Cambium and to assign to us any inventions that you make while employed by the Company. For the avoidance of doubt, nothing contained in this Agreement or the Confidentiality, Invention Assignment, Non-Competition, and Non-Solicitation Agreement limits your ability to report possible violations of law or regulation to, or file a charge or complaint with any federal, state or local governmental agency or commission ("Government Agencies"). Further, nothing in this Agreement or the Confidentiality, Invention Assignment, Non-Competition, and Non-Solicitation Agreement shall limit your ability under applicable law to (i) disclose in confidence trade secrets to federal, state, and local government officials, or to an attorney, for the sole purpose of reporting or investigating a suspected violation of law, (ii) disclose trade secrets in a document filed in a lawsuit or other proceeding, but only if the filing is made under seal and protected from public disclosure or (iii) communicate with any Government Agencies or otherwise participate in any investigation or proceeding that may be conducted by any Government Agency, including providing documents or other information, without notice to the Company.

It is the Company's policy not to infringe upon the proprietary information, trade secrets, or confidential information of third parties. In addition, it is the Company's policy not to interfere with third parties' contractual or business relations. Accordingly, by signing this Agreement you represent and warrant that you are not subject to any non-disclosure agreement (including any agreement concerning trade secrets or confidential information owned by any other party), non-compete agreement, non-solicitation agreement, and/or any other agreement that would prevent you from performing your duties for the Company and/or restrict your activities at Cambium.

Neither this Agreement nor the Confidentiality, Invention Assignment, Non-Competition, and Non-Solicitation Agreement constitute a contract of employment for any specific period of time, but instead will create an "employment at will" relationship, meaning that either you or the Company may terminate the employment relationship at any time, for any lawful reason. In addition, nothing in this Agreement prohibits the Company from terminating or modifying any of its compensation or benefits programs at any time. The offer of employment as described in this Agreement is contingent on satisfactory completion of a criminal background check, an education verification to be administered by the Human Resources department and your completion of other required and customary onboarding documentation.

Please confirm your acceptance of this Agreement in the space indicated and return this Agreement to me by June 28, 2018. Unless we agree otherwise, this offer will expire if not accepted by that date. Should you have any questions about this Agreement, please do not hesitate to contact me.

I look forward to having you join the team and to your contributions to the success of Cambium.

Sincerely,

/s/ Atul Bhatnagar

Atul Bhatnagar
President & CEO

ACCEPTED AND AGREED

June 24, 2018

Date

/s/ Stephen Cumming

Signature

Stephen Cumming

Print Name

Exhibit 10.33

March 19, 2020

Stephen Cumming
c/o Cambium Networks, Inc.
3800 Golf Road, Suite 360
Rolling Meadows, IL 60008

Dear Stephen,

This letter agreement serves as a modification to your existing offer letter (the "Offer Letter") with Cambium Networks, Inc. (the "Company"), dated as of June 27, 2018. The paragraph entitled "Severance" shall be replaced in its entirety with the following:

- **Severance.** In the event your employment is terminated by the Company without cause prior to a Change in Control (as defined in the Cambium Networks Corporation 2019 Share Incentive Plan), you shall receive six months of base salary continuation during the six-month period following your termination of employment, with such payments to occur in equal monthly installments; provided, however, in the event your employment is terminated by the Company (or its successor) without cause within 12 months following a Change in Control, you shall receive (i) one-year of base salary, payable in equal monthly installments during the 12-month period following your termination, (ii) a pro-rata portion of your annual bonus for the fiscal year in which your termination occurs based on actual results for such year (determined by multiplying the amount of such bonus which would be due for the full fiscal year by a fraction, the numerator of which is the number of days during the fiscal year of termination that you were employed by the Company and the denominator of which is 365) payable at the same time bonuses for such year are paid to other senior executives of the Company (but no later than March 15th following the conclusion of the fiscal year in which the bonus is earned); and (iii) subject to your timely election of continuation coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended, continued participation in the Company's group health plan (to the extent permitted under applicable law and the terms of such plan) which covers you (and your eligible dependents) for a period of twelve (12) months at the Company's expense. The severance benefits shall be subject to your execution and non-revocation of a customary release of claims in favor of the Company within the period specified by the Company (but in any event not to exceed 52 days following your termination) and any payments that would be paid to you prior to the effectiveness of the release shall be delayed and paid to you in one installment on the 60th day following your termination of employment. The payments under this paragraph are subject to your continued compliance with your Confidentiality, Invention Assignment, Non-Competition, and Non-Solicitation Agreement.

In addition, Offer Letter shall be amended to add the following at the end thereof:

> This Agreement is intended to comply with the requirements of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), and shall be interpreted and construed consistently with such intent. The payments to you pursuant to this Agreement are also intended to be exempt from Section 409A of the Code to the maximum extent possible, under either the separation pay exemption pursuant to Treasury regulation §1.409A-1(b)(9)(iii) or as short-term deferrals pursuant to Treasury regulation §1.409A-1(b)(4), and for such purposes, each installment paid to you under this Agreement shall be considered a separate payment. In the event the terms of this Agreement would subject you to taxes or penalties under Section 409A of the Code ("409A Penalties"), the Company and you shall cooperate

diligently to amend the terms of the Agreement to avoid such 409A Penalties, to the extent possible; provided that in no event shall the Company be responsible for any 409A Penalties that arise in connection with any amounts payable under this Agreement. To the extent any amounts under this Agreement are payable by reference to your "termination of employment" such term and similar terms shall be deemed to refer to your "separation from service," within the meaning of Section 409A of the Code. Notwithstanding any other provision in this Agreement, if you are a "specified employee," as defined in Section 409A of the Code, as of the date of your separation from service, then to the extent any amount payable under this Agreement (a) constitutes the payment of nonqualified deferred compensation, within the meaning of Section 409A of the Code, (b) is payable upon your separation from service and (c) under the terms of this Agreement would be payable prior to the six-month anniversary of your separation from service, such payment shall be delayed until the earlier to occur of (i) the six-month anniversary of the separation from service or (ii) the date of your death. In addition, each payment of nonqualified deferred compensation, within the meaning of Section 409A of the Code, which is conditioned upon your execution of a release and which is to be paid during a designated period that begins in a first taxable year and ends in a second taxable year shall be paid in the second taxable year.

Except as amended by this letter agreement, the Offer Letter remains in full force and effect in accordance with its terms.

Sincerely,

/s/ATUL BHATNAGAR

Cambium Networks, Inc.

ACCEPTED AND AGREED

/s/STEPHEN CUMMING

Stephen Cumming

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Cambium Networks Corporation:

We consent to the incorporation by reference in the registration statement (No. 333-232341) on Form S-8 of Cambium Networks Corporation of our report dated May 3, 2019, except for note 12 and note 13, as to which the date is June 12, 2019, with respect to the consolidated balance sheet of Cambium Networks Corporation as of December 31, 2018, the related consolidated statements of operations, comprehensive income/(loss), shareholders' (deficit)/equity, and cash flows for each of the years in the two-year period ended December 31, 2018, and the related notes, which report appears in the December 31, 2019 annual report on Form 10-K of Cambium Networks Corporation.

/s/ KPMG LLP

London, United Kingdom
March 23, 2020

Exhibit 23.2

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Cambium Networks Corporation:

We consent to the incorporation by reference in the registration statement (No. 333-232341) on Form S-8 of Cambium Networks Corporation of our report dated March 23, 2020, with respect to the consolidated balance sheet of Cambium Networks Corporation as of December 31, 2019, the related consolidated statements of operations, comprehensive loss, shareholders' equity, and cash flows for the year ended December 31, 2019, and the related notes (collectively, the consolidated financial statements), which report appears in the December 31, 2019 annual report on Form 10-K of Cambium Networks Corporation.

Our report refers to a change to the lease accounting principle as a result of the adoption of Accounting Standards Codification Topic 842, *Leases*.

/s/ KPMG LLP

Chicago, Illinois
March 23, 2020

Exhibit 31.1

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

I, Atul Bhatnagar, certify that:

1. I have reviewed this Annual Report on Form 10-K of Cambium Networks 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 23, 2020

By: /s/ ATUL BHATNAGAR
Atul Bhatnagar
Chief Executive Officer

Exhibit 31.2

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

I, Stephen Cumming, certify that:

1. I have reviewed this Annual Report on Form 10-K of Cambium Networks 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 23, 2020

By: /s/ STEPHEN CUMMING
Stephen Cumming
Chief Financial Officer

Exhibit 32.1

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of Cambium Networks Corporation (the “Company”) on Form 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: March 23, 2020

By: /s/ ATUL BHATNAGAR
Atul Bhatnagar
Chief Executive Officer

Exhibit 32.2

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of Cambium Networks Corporation (the "Company") on Form 10-K for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: March 23, 2020

By: /s/ STEPHEN CUMMING

Stephen Cumming
Chief Financial Officer