

**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, 2020

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 001-38324

Casa Systems, Inc.

(Exact name of Registrant as specified in its Charter)

Delaware
(State or other jurisdiction of
incorporation or organization)
100 Old River Road
Andover, Massachusetts
(Address of principal executive offices)

75-3108867
(I.R.S. Employer
Identification No.)

01810
(Zip Code)

Registrant's telephone number, including area code: (978) 688-6706

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, \$0.001 par value per share	CASA	The Nasdaq Stock Market LLC

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

None
(Title of class)

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

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or 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, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer
Non-accelerated filer

Accelerated filer
Small 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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Registrant, based on the closing price of the shares of Common Stock on The Nasdaq Global Select Market on June 30, 2020 was approximately \$126.4 million.

The number of shares of Registrant's Common Stock outstanding as of January 29, 2021 was 84,009,729.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant's definitive proxy statement relating to its 2021 Annual Stockholders' Meeting expected to be filed pursuant to Regulation 14A within 120 days after the Registrant's fiscal year end of December 31, 2020 are incorporated by reference into Part III of this Annual Report on Form 10-K.

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Cautionary Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements other than statements of historical fact contained in this Annual Report on Form 10-K, including statements regarding our future results of operations and financial position, business strategy and plans and objectives of management for future operations, are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as “may,” “might,” “should,” “expects,” “plans,” “anticipates,” “would,” “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 Annual Report on Form 10-K and are subject to a number of risks, uncertainties and assumptions described in the “Risk Factors” section and elsewhere in this Annual Report on Form 10-K. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as 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:

- our ability to anticipate technological shifts;
- our ability to generate positive returns on our research and development;
- changes in the rate of communications service providers’, or CSPs’, deployment of, and investment in, ultra-broadband network capabilities;
- the lack of predictability of revenue due to lengthy sales cycles and the volatility in capital expenditure budgets of CSPs;
- our ability to maintain and expand operating profit and net income;
- the sufficiency of our cash resources and needs for additional financing;
- our ability to further penetrate our existing customer base and obtain new customers;
- changes in our pricing policies, whether initiated by us or as a result of competition;
- the amount and timing of operating costs and capital expenditures related to the operation and expansion of our business;
- the extent of the effects of the COVID-19 pandemic on the Company, which is highly uncertain and will depend on future developments;
- the potential impact of the COVID-19 pandemic on our suppliers, our business operations and our customers;
- the actual or rumored timing and success of new product and service introductions by us or our competitors or any other change in the competitive landscape of our industry, including consolidation among our competitors or customers;
- our ability to successfully expand our business domestically and internationally, including our ability to maintain the synergies we have realized from our acquisition of NetComm Wireless Limited, or NetComm;
- insolvency or credit difficulties confronting our customers, which could adversely affect their ability to purchase or pay for our products and services, or confronting our key suppliers, which could disrupt our supply chain;
- our inability to fulfill our customers’ orders due to supply chain delays, access to key commodities or technologies or events that impact our manufacturers or their suppliers;
- future accounting pronouncements or changes in our accounting policies;
- stock-based compensation expense;

- our overall effective tax rate, including impacts caused by the relative proportion of foreign to U.S. income, the amount and timing of certain employee stock-based compensation transactions, changes in the valuation of our deferred tax assets and any new legislation or regulatory developments;
- increases or decreases in our expenses caused by fluctuations in foreign currency exchange rates;
- the costs and possible outcomes of any legal actions or proceedings against us, including those described under “Part I, Item 3–Legal Proceedings”;
- general economic conditions, both domestically and in foreign markets;
- our ability to obtain and maintain intellectual property protection for our products; and
- our use of proceeds from our initial public offering.

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.

SUMMARY OF THE MATERIAL RISKS ASSOCIATED WITH OUR BUSINESS

Our business is subject to numerous risks and uncertainties, including those described in Part I, Item 1A “Risk Factors” in this Annual Report on Form 10-K. The principal risks and uncertainties affecting our business include the following:

- We believe the CSP industry is in the early stages of a major architectural shift toward the virtualization and cloudification of networks and the use of networks with distributed architectures. If the architectural shift does not occur, if it does not occur at the pace we predict, or if the products and services we have developed are not attractive to our customers after such shift takes place, our revenues could decline.
- If we do not successfully anticipate technological shifts, market needs and opportunities, and develop new products and product enhancements that meet those technological shifts, needs and opportunities, we may not be able to compete effectively.
- Our success depends in large part on CSPs’ continued deployment of, and investment in, ultra-broadband network capabilities and technologies that make use of our solutions.
- Our continued growth depends on the pace and level of our customers’ investment in 5G and 5G-related technologies, as well as our success in selling our 5G products to our existing and new customers.
- We face intense competition, including from larger, well-established companies, and we may lack sufficient financial or other resources to maintain or improve our competitive position.
- Timing of large orders and seasonality in our revenue may cause our quarterly revenue and results of operations to fluctuate and possibly decline materially from quarter to quarter.
- Our sales to the CSP market are volatile and our sales cycles can be long and unpredictable. As a result, our sales and revenue are difficult to predict and may vary substantially from period to period, which may cause our revenue and results of operations to fluctuate and possibly decline significantly.
- We expect certain of our customers will continue to represent a substantial portion of our revenue.
- If we are unable to sell additional products to our existing customers, our revenue will be adversely affected.
- Our converged cable access platform, or CCAP, solutions currently represent a significant percentage of our product sales; our business would be adversely affected in the event we are unable to sell one or more of our CCAP products.
- Our products are necessary for the operation of our customers’ broadband service operations. Product quality problems, warranty claims, services disruptions, or other defects, errors or vulnerabilities in our products or services could harm our reputation and materially adversely affect our business, financial condition, results of operations and prospects.
- Because we depend on third-party manufacturers to build our hardware, we are susceptible to manufacturing delays and pricing fluctuations that could prevent us from delivering customer orders on time, if at all, or on a cost-effective basis, which may result in the loss of sales and customers.
- Because some of the key components in our products come from limited sources of supply, we are susceptible to supply shortages or supply changes, which could disrupt or delay our scheduled product deliveries to our customers and may result in the loss of sales and customers.
- We have outstanding debt that could limit our ability to make expenditures and investments in the conduct of our business and adversely impact our ability to obtain future financing.
- Litigation could distract management, increase our expenses or subject us to material money damages and other remedies.
- The coronavirus outbreak could negatively impact our operations and have an adverse effect on our revenues and/or results of operations.
- The coronavirus outbreak has resulted in an increase in demand for certain of our solutions, which may subside or decrease when the pandemic ends.
- Assertions by third parties of infringement or other violations by us of their intellectual property rights, or other lawsuits asserted against us, could result in significant costs and materially adversely affect our business, financial condition, results of operations and prospects.

- Our indemnification obligations to our customers and business partners for claims of intellectual property infringement or misappropriation are relatively broad in scope and could result in significant liability for us.
- Our results of operations are likely to vary significantly from period to period and be unpredictable. If we fail to meet the expectations of analysts or investors, the market price of our common stock could decline substantially.
- The market price of our common stock has been volatile in the past and may be volatile in the future, which could result in substantial losses for investors.
- Insiders have substantial control over us, which could limit your ability to influence the outcome of key transactions, including a change of control.
- A significant portion of our total outstanding shares may be sold into the public market at any time, which could cause the market price of our common stock to drop significantly, even if our business is doing well.
- Anti-takeover provisions in our restated certificate of incorporation and our amended and restated bylaws, as well as provisions of Delaware law, might discourage, delay or prevent a change in control of our company or changes in our management and, therefore, depress the trading price of our common stock.

PART I

Item 1. Business.

Overview

Our solutions enable our CSP customers to offer high bandwidth data services to their subscribers. We help our customers transform and expand their public and private high-speed data and multi-service communications networks with physical, virtual and cloud-native 5G infrastructure and customer premise networking equipment, so that they can meet the growing demand for bandwidth and new services. Our core and edge convergence technology enables CSPs and enterprises to cost-effectively and dynamically increase network speed, add bandwidth capacity and new services, reduce network complexity, and reduce operating and capital expenditures regardless of access technology.

Our solutions are commercially deployed in over 70 countries by more than 475 customers, including regional service providers as well as some of the world's largest Tier 1 CSPs, serving millions of subscribers. Our principal customers include Charter Communications, Rogers, Videotron, T-Mobile, Verizon, AT&T, Bell Canada, Cable One, Mediacom Windstream and Lumen in North America; Televisa/IZZI Mexico, Megacable Mexico, Cablevision Argentina, Claro Brazil, America Móvil and Claro Colombia in Latin America; Liberty Global, Vodafone and DNA Oyj in Europe; and NBN, SCSK Corporation, Jupiter Communications, Beijing Gehua CATV Networks, China Mobile, Softbank, Kbro and CNS in Asia-Pacific.

Our revenue for the years ended December 31, 2020, 2019 and 2018 was \$393.2 million, \$282.3 million and \$297.1 million, respectively. Our net income (loss) for the years ended December 31, 2020, 2019 and 2018 was \$24.8 million, (\$48.2) million and \$73.0 million, respectively. As of December 31, 2020 and 2019, our total assets were \$493.0 million and \$444.3 million, respectively.

Industry Trends that Drive our Growth

Annual Increase in Demand for Bandwidth

Demand for both downstream and upstream bandwidth from consumers and enterprises has grown substantially and is expected to continue to increase. Key drivers of increased bandwidth demand include:

- more users with more connected devices and applications;
- more time spent online by users;
- increased use of bandwidth-intensive streaming media services, such as Amazon Prime Video, Netflix, Hulu and YouTube; cloud applications, such as iCloud, Office 365/OneDrive, and Dropbox; and augmented and virtual reality applications;
- Internet of Things, or IoT, solutions, as already seen in connected homes, businesses and industries; connected devices such as Amazon Alexa or Google Assistant; machine-to-machine connectivity; car connectivity; and smart cities;
- growth in online, interactive gaming;
- backhaul requirements of wireless service providers, including new entrants into the wireless space such as multiple system operators, or MSOs;
- the increase in data consumption by enterprises with strict latency requirements on mission-critical and public safety-related applications;
- increasing need for greater uplink bandwidth from home or office to the cloud; and
- increased network data traffic as subscribers work from home during the COVID-19 pandemic.

Transformation of Communications Network Infrastructure

To meet the growing demand for utility-grade broadband connectivity, service providers are undertaking a significant transformation in network architecture from the core of the network all the way through to the customer premise equipment. Three key trends are evident in this transformation and, we believe, are important for our growth: densification, network convergence, and cloudification.

- *Densification.* Increasing demand for bandwidth and user expectations for ubiquitous, seamless and reliable connectivity require the addition of more access points at the network edge and at customer premises for users to connect to broadband networks, also known as *network densification*. As a result, CSPs across all access technologies are shifting from centralized to more distributed architectures. Densification requires extending network connectivity and distributing access aggregation solutions closer to end users. For cable operators this entails deploying more access aggregation nodes and reducing the size of service groups per node. For wireless operators, particularly in 5G, this will lead to an emphasis on small, versus traditional macro, cells in new network deployments.
- *Network Convergence.* Traditionally service providers have deployed separate, siloed networks to deliver both fixed (cable, fiber or copper DSL) and mobile broadband to their subscribers. To meet the demands of next generation networks and to realize greater cost efficiencies in network deployment and operation, service providers are focused on converging these siloed fixed and mobile core networks into a single converged 5G Core. The 5G Core will be the heart of the network and act as an anchor point for multi-access technologies to deliver a seamless service experience across fixed and wireless access technologies. 3GPP, the global wireless standards body, has defined a new 5G Core architecture that supports service delivery over wireless, fixed or converged networks.
- *Network virtualization and Cloudification (“Networking as a Service”).* Increased consumption of video and other high-bandwidth applications that demand low latency are forcing CSPs to fundamentally rethink their data networks. Network virtualization, in which network software is decoupled from dedicated servers and re-deployed on commodity hardware, was a first step in transforming networks. Virtualization enables several significant benefits to service providers, such as increased operational efficiency, upgradability, configuration flexibility, service agility and scalability. But to meet 5G specifications that call for features like software-defined networking, multi-access mobile edge computing, and rapid deployment of network slices additional network architecture modification will be required. We believe that network cloudification is the path forward to solve this challenge, where network functions will be hosted in edge data centers with access delivered through the Internet (public cloud) or via private networks (private cloud). We believe that cloudified networks will provide better support for scalability, agility, innovation, and low latency application and service delivery, as well as the potential for significant cost savings.

Adoption of 5G

- *Fifth Generation, or 5G, Mobile Networks.* 5G, the latest generation of cellular technology, is expected to change the way people live and work. 5G will enable a significant increase in the amount of data transmitted over wireless networks due to more available bandwidth and advanced antenna technology. Engineered to provide speeds higher than 2 Gbps, 5G will also offer improved capacity, scale, latency and reliability. In upgrading to 5G, CSPs will require new core and access infrastructure. By 2026, some estimates predict that 60% of the world’s population will be covered by 5G networks, and 5G subscriptions are forecast to grow to 3.5 billion.¹ As a result, we believe that demand from our existing and new customers for our 5G core, access infrastructure and customer premise devices will be an important driver of our growth for the next several years.

¹ Ericsson Mobility Report, November 2020

- *5G Fixed Wireless Access, or FWA, likely to become mainstream.* A key component of 5G networks will be the promotion of FWA to a more mainstream broadband access medium. FWA services use the mobile network to deliver high-speed fixed broadband connections in areas where there may not be existing high-speed fixed broadband services and where it may not be feasible or cost-effective to deploy other high-speed access technologies such as fixed-line DSL, hybrid fiber coaxial cable, and fiber-to-the-premise. While FWA is not a new broadband technology, until recently the technology was unable to replicate the speed and reliability of fiber broadband. As a result, its deployment was mainly limited to remote communities in under-served rural areas. However, with the introduction of 5G, breakthroughs in FWA technology, and access to millimeter wave spectrum, these technical limitations no longer exist. FWA now has the potential to move from a niche access technology alternative in rural markets to a more mainstream access medium that includes residential suburban and urban markets, as well as enterprise campuses.

Market Opportunity

We believe that our products are well suited to address these trends and accordingly present us with a significant market opportunity across all access technologies. Historically, we have generated the significant majority of our revenue from the cable market with our converged cable access platform, or CCAP. However, since 2019 we have become more diversified as a result of our acquisition of NetComm and the introduction of solutions for wireless and fixed-line broadband networks. We believe that this has expanded our total addressable market from approximately \$1.2 billion in 2019 to \$35 billion in 2023.²

We expect to continue to generate revenue in the future from growth in the cable market and increased revenue from sales of both wireless and fixed-line broadband solutions to new and existing customers. We believe there is an opportunity for us to take new market share as fixed and wireless networks continue to converge.

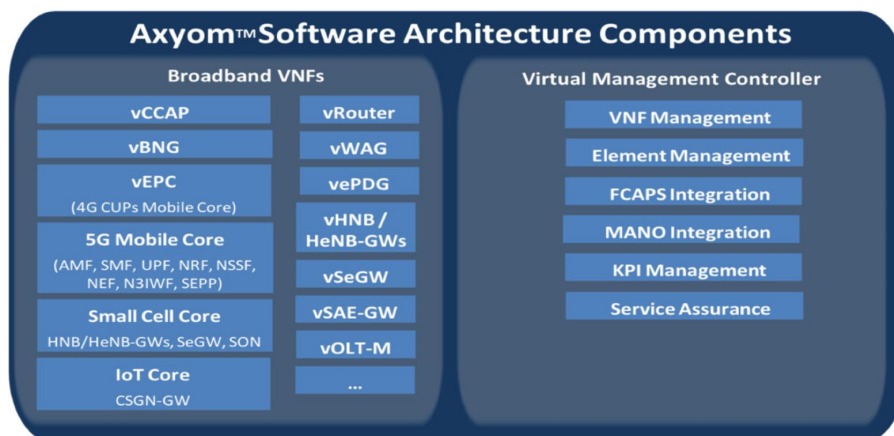
Key Benefits of Our Solutions

Highly Flexible, Service-Oriented, Cloud-Native Architecture

Our multi-service broadband platform, Axyom, is at the heart of all of our core network infrastructure products. Axyom is a web scale solution based on a distributed micro-service framework. The Axyom Software Platform includes Casa Systems' virtual software workloads and the software that manages those micro-services. The Axyom software architecture includes virtual network functions (or VNFs) for all CSPs – mobile, fixed, cable and converged. Casa's VNFs are developed from the ground up using cloud native principles to not only ensure scalability and flexibility but to ensure that the Axyom VNFs are optimized for the virtual computing environment in which they will run.

² Gartner, Communications Service Provider Operational Technology (2018); ABI Research, Mobile Packet Core VNFs and PNFs Market Data; and Dell'Orro Group: Broadband Access Five Year Forecast report (2019); SNS Research, 5G for FWA 2017-2030

The Axyom software platform offers a large catalogue of ultrabroadband services, while the Axyom Virtual Management Controller (or VMC) provides life-cycle VNF Management, element management system functions and Northbound interfaces to Network Function Virtualization (or NFV) Orchestrators and SDN Controllers. With the ability to support multiple application level KPIs, the VMC provides the control and visibility needed to orchestrate large numbers of VNFs instances running simultaneously and to manage them through their lifecycle.



Each Casa VNF is designed around the following design principles:

- Supports **stateless processing** – Axyom VNFs are designed to use a centralized in-memory data store for state and subscriber/session information.
- Can be **orchestrated** – Axyom VNFs have been integrated with several industry leading orchestration solutions, such as NetCracker, HP Enterprise and Amdocs.
- Composed of **microservices** – Casa’s microservices operate at web-scale and can be individually managed. They include core microservices that implement business logic and support microservices that support all VNFs. Overall Axyom microservices are designed to be self-contained so that they can be individually upgraded and also chained clustered into VNFs and services. This cloud native approach provides maximum flexibility and operational efficiency
- Supports **convergence solutions** – Many service providers serve a combination of mobile, fixed and cable broadband subscribers. The Axyom Software Platform not only delivers optimized solutions specific to mobile, fixed and cable broadband networks, but Axyom is also designed to support converged solutions. Casa also provides microservices that can share a common User Plane Function (UPF) in a multi-access environment, capabilities that provide service providers with common and superior resource management.
- Allows **location independence** – Casa’s core network solutions are disaggregated, allowing control and user plane compute resources to be located in the right place for specific use cases. As an example, if the goal is low latency, Axyom allows the user plane VNF to be located on an edge server.
- Enables **deployment flexibility** – the Axyom Software Platform provides flexibility since it allows service providers to transition from current monolithic, legacy solutions to Axyom VNFs that can be run on bare metal or in virtual environments, either virtual machines or containers.

End-to-End Products on a Converged Core and Multi-Access Intelligent Edge

We offer a full end-to-end portfolio of all-access broadband network solutions that extend from a cloud-native, converged network core to the customer premises. Our products help CSPs deploy more capacity at the network edge, closer to where end users and devices are accessing the network, thereby increasing available bandwidth and reducing latency to improve quality of service. In addition, our converged network core supports wireline and wireless access and avoids separate cores for each access type with overlapping functions (subscriber management, session management, transport security, access aggregation and radio frequency, or RF, management) within the network. This enables operators to reduce long-term capital expenditures and operating expenses. Our convergence solutions may also enable operators to more consistently deliver services and execute policy across different access types.

Ability to Upgrade Networks Remotely with Rapid, Seamless Addition of Bandwidth Capacity

We designed our programmable architecture to enable rapid and seamless expansion of network capacity with the purchase of additional software licenses. This flexible approach helps CSPs respond to increased customer demands with rapid bandwidth and service provisioning.

Additionally, our programmable architecture allows us to deploy technology updates to our customers remotely without the expense, disruption or network downtime caused by hardware replacements or field visits by personnel, while minimizing network downtime. We can remotely implement additional features or capacity in order to scale our solutions to meet the needs of our customers as they look to broaden the use and capabilities of our solutions. Similarly, we are often able to troubleshoot and assist our customers with technical issues through seamless software updates.

Reduced Network Complexity and Lower Total Cost of Ownership

Our converged software platform allows CSPs to significantly reduce the complexity, footprint requirements and costs of their networks by reducing parallel and otherwise redundant network architecture. The large capacity increases that our solutions enable, and the ability of our solutions to deliver broadband services over a converged core, translates to fewer pieces of equipment in the network and lower energy usage, operating costs and capital expenditures.

Our Growth Strategy

The key elements of our growth strategy are:

Continue to Innovate and Extend Technology Leadership Through R&D Investment

We believe that we offer market-leading broadband infrastructure solutions today. We intend to continue to enhance our existing solutions and develop new solutions in both our current and adjacent markets. For example, we have invested in and launched distributed access architecture solutions to allow our cable customers to densify their networks, providing higher bandwidth, which enhances user experience. Additionally, we have been investing in our core and access solutions for 4G/LTE and 5G wireless networks.

Further Penetrate Existing Customers

Our customers often deploy our solutions in a specific region or for a specific application, which may only account for a portion of their overall network infrastructure needs. We plan to expand our footprint within the networks of existing customers as they realize the technological and financial benefits of our solutions, as well as sell our new solutions to them as they offer new broadband services to their subscribers.

Expand our Customer Base by Expanding the Breadth of Solutions Sold to Customers

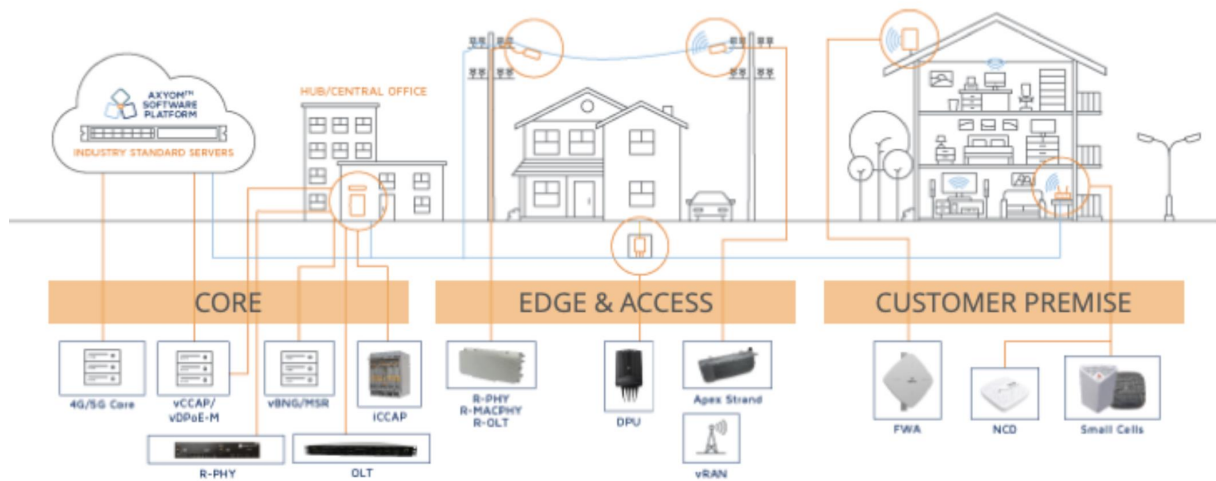
We intend to sell additional solutions to our growing installed base of CSPs, particularly as they increasingly offer converged services to their subscribers. We have invested in developing a cloud-native platform that allows us to rapidly provide new applications and services to our customers. While we initially focused on providing solutions for cable service providers due to our founders' experience in the cable industry, the commonalities between fixed and wireless network architectures have allowed us to expand our solutions into the fixed telco and wireless markets. Our fixed telco and wireless solutions have been purchased by several customers, including Tier 1 network operators globally.

Invest in Our Platform through Selective Acquisitions

We may selectively pursue acquisitions that enhance our existing platform capabilities and are consistent with our overall growth strategy. For example, on July 1, 2019, we acquired NetComm for cash consideration of \$162.0 million Australian dollars, or AUD (\$112.7 million United States dollars, or USD, based on an exchange rate of USD \$0.700 per AUD \$1.00 on July 1, 2019). This acquisition has enabled us to expand our customer base, enhance our global footprint, extend our product portfolio to the far edge of the network, and further diversify our revenue sources.

Solutions and Technology

We offer end-to-end cloud-native, virtual, physical and distributed infrastructure and customer premise network solutions that enable our customers to provide fixed and wireless broadband services to consumers and enterprises.



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Wireless

Network Core

- **Virtual Evolved Packet Core (or vEPC).** Virtualizing the LTE EPC allows service providers to reduce network operating costs, improve network efficiency and deploy new services faster. Built from the ground up, our vEPC is optimized for virtualized environments and implements control and user plane separation (or CUPS). It can be deployed stand alone or in conjunction with our other core network products, such as our Security and Small Cell Gateways.
- **5G Core.** We built our 5G core, converged to support fixed and wireless networks, to help service providers implement the shift from a single, one-size-fits-all core network toward a core that provides different logical networks (or “slices”) for different traffic requirements to support new use cases, including IoT, Enhanced Mobile Broadband, and Mission Critical Services. Our 5G core delivers several important features including:
 - o higher Gbps per vCPU;
 - o a solution deployable in containers with virtual machines, or VMs, or bare metal;
 - o location-independent placement of the control and user plane in a CUPS architecture;
 - o a smooth migration from 4G to 5G with efficient internal messaging between 4G and 5G network components; and
 - o network slicing in a service-based architecture.
- Other elements of our core infrastructure network solutions include our Security Gateway, which enables secure encrypted access for subscribers roaming between trusted and untrusted networks, while providing high levels of density and performance, and our Wireless Gateway, which enables routing and security functions as well as traffic management, to provide secure connectivity for wireless endpoints and to enable broadband services such as LTE over Wi-Fi, including Wi-Fi calling.

Small Cell solutions

- *Apex family of Small Cells.* Our portfolio of indoor and outdoor Apex small cell solutions consists of remotely deployable access points that provide cellular connectivity services at the network edge in conjunction with transport security functions to address coverage and capacity challenges. These solutions allow CSPs to more cost-effectively densify their networks while simultaneously improving coverage and enhancing throughput. Our small cell portfolio includes our:
 - o Lifestyle residential small cell, the Apex Pebble, which uses the user's broadband connection rather than a cell tower connection to provide wireless service in areas outside of the operator's coverage areas. We believe that our Apex Pebble offers unique features that include:
 - attractive design that is intended to drive better acceptance by subscribers and thereby provide better RF coverage than utilitarian-looking small cells that are likely to be hidden away in places that reduce RF propagation; and
 - untethered Wi-Fi backhaul option, versus the ethernet backhaul requirement in comparable traditional femtocells, which allows a user to place the device anywhere in his or her home where Wi-Fi is available without running or connecting additional cables to a home router.
 - o Apex enterprise small cell with 4G radio capability, which supports two LTE carriers, in a small form factor.
 - o Apex Strand solution, which is designed for both MSOs and mobile network operators, supports two LTE carriers (licensed LTE bands or citizens band radio service, or CBRS), and takes advantage of existing hybrid-fiber cable, or HFC, strand to help solve the power, backhaul and siting issues that accompany large-scale small cell deployments.
 - o 5G indoor small cell, which offers support for licensed LTE/5G bands and eventually CBRS and C-Band and is designed for environments with a large number of subscribers or where a larger coverage area is required. Our 5G indoor small cell helps our wireless customers meet the coverage and capacity challenges in dense urban and suburban areas where large numbers of NR and LTE devices are present. The 5G indoor small cell All-in-One package includes the baseband unit and the radio remote unit with flexible external antenna configurations. It also supports open radio access network defined interfaces for centralized and virtualized radio access network deployments.

Axyom Element Management System (AeMS)

- We designed our AeMS to make small cell deployment and management more efficient for service providers as they expand and evolve their mobile access networks. Our virtualized AeMS provides full life-cycle management, which allows the provider to manage large scale deployments of small cells within complex network environments. It includes key management tools that facilitate integration with existing networks and increase radio access network utilization with zero-touch plug and play configuration of small cells. The AeMS provides visibility and access to all modules from a single-pane-of-glass dashboard which gives service providers the ability to monitor and control small cells efficiently and effectively. In 2020 we expanded our AeMS to use cases beyond small cell deployment management, and have connected our distribution point unit, or DPU. In 2021 we expect to add to our fixed-wireless access solutions.

Fixed Wireless Access

- Our Fixed Wireless Access (FWA) solutions enable service providers to offer fixed, ultra-broadband services to their customers where the service provider does not own copper, fiber or coaxial cable to the customer premise, or where these access media are not cost-efficient to deploy. Connections are instead serviced by a 3GPP compliant wireless connection in a manner that optimizes overall network efficiency and provides a higher grade of broadband service than would typically be achieved via a typical mobile handset. Our fixed wireless solutions support 4G and 5G, including our newly launched 5G millimeter wave FWA device. These can be delivered as self-install indoor units or as pro-install outdoor units that are mounted to the side of the customer premise. We designed our portfolio with a heavy emphasis on reducing the total cost of ownership for operators, achieved through class-leading hardware performance and build quality and our range of install accessories that optimize the installation process and overall install success rate.

Cable

Our solutions for cable service providers can be deployed in a centralized, distributed or virtual environment. While centralized deployments allow our customers to deploy all critical CCAP functions in a single location, distributed and virtual deployments enable our customers to densify the access network by distributing access deeper into the network, away from existing data centers.

Virtual Deployment

- Cable service providers are actively evaluating virtualized versions of network functions, as well as software-defined networking control and orchestration to enable faster service creation and more nimble response to changes in service and bandwidth demand. In cable access networks, this trend is accompanied by fiber-deep strategies that push required ultra-broadband bandwidth closer to subscribers. Our Distributed Access Architecture solutions and virtual converged cable access platform, or vCCAP, create a secure, scalable, high-performance next-generation cable access network.
- Our vCCAP provides all the features of our C100G CCAP on commercial-off-the-shelf, or COTS, servers in a flexible architecture that enables independent scaling of control and data planes. We built our vCCAP on our Axyom modular software framework for the cloud from the ground up. It delivers high performance and deployment flexibility in edge or core environments. Our virtual solutions also enable migration from physical network functions (or PNFs) to VNFs with a common management interface to both.
- While our customers continue primarily to rely on their existing i-CCAP infrastructure to provide gigabit broadband service to their customers, our vCCAP and Distributed Access Architectures (or DAA) products have been deployed by several of our customers and, as of December 31, 2020, we are currently in over 70 trials with our customers globally.

Centralized Deployment

Integrated CCAP – C100G and C40G

- Our C100G CCAP combines (i) cable modem termination system, or CMTS, functionality, which enables IP data transport from data centers to end-users over cable networks, including voice over IP, or VoIP, and (ii) edge-quadrature amplitude modulation, or Edge-QAM, functionality to enable video delivery over cable networks in one integrated chassis. We believe our C100G CCAP was the first solution offering full CCAP functionality, allowing the delivery of voice, video and data on a single platform. Our C100G CCAP also features high downstream speeds of up to 10 gigabits per second, high upstream channel capacity, and low space and energy consumption requirements. Using our C100G CCAP, our customers whose networks are configured for DOCSIS 3.0 can adopt DOCSIS 3.1 through either a software upgrade or a simple line card addition, while continuing to service their customers who use DOCSIS 3.0 modems. We are also able to increase capacity for our C100G CCAP through channel expansions, which are delivered via software-enabled increases in bandwidth capacity. We believe that our software-centric approach will enable us to seamlessly provide our customers with future updates as standards evolve.
- In addition to our C100G CCAP, we also offer our C40G CCAP, which provides per rack unit performance comparable to that of our C100G CCAP, but in a smaller form factor.
- Our CCAP solutions offer three key differentiating applications compared to a single cable network:
 - *DOCSIS Core.* Provides high-speed delivery of IP data for broadband connectivity services, including VoIP.
 - *Video Core.* Delivers high-speed video processing, including for HD and 4K.
 - *Intelligent Routing.* Intelligently manages network traffic to optimize service quality.

Distributed Deployment

- DAAs offer a new approach for service providers that are looking to increase capacity in their networks. Our family of DAA solutions is designed to help service providers push capacity to the network edge to improve the services their subscribers enjoy, extract more value from existing investments, and maintain smooth operations in the transition from centralized to distributed access architectures.

- Our family of DAA solutions includes:
 - Physical or virtual CCAP cores that deliver full CCAP and full spectrum DOCSIS 3.1 support and are compliant with CableLabs' interoperability standards.
 - The CCAP Service Card, or CSC, deployable in our C100G or C40G chassis, which provides the complete DOCSIS and Edge-QAM media access control, or MAC, functions as well as traffic aggregation for the DAA nodes or shelves.
 - A range of DAA node and shelf form factors that perform complete DOCSIS and EQAM physical layer, or PHY, or MAC/PHY functions. Our remote PHY, or R-PHY, solutions for cable networks retain software-driven network control and intelligence functions at the network core while placing physical layer functions remotely in a fiber node and the network edge. Our remote MAC/PHY, or R-MAC/PHY, solution for cable networks offers the capabilities of our R-PHY solution while also moving media access control functions from the network core to remotely deployed R-MAC/PHY nodes.
 - 10G Ethernet transport between the CCAP core and the DAA nodes.

Bandwidth Capacity Expansion

- *Software.* Our customers can add additional bandwidth capacity to their CCAP solutions by purchasing perpetual software license upgrades. Our software platform also permits additional features to be provisioned remotely, as compared to hardware-centric solutions, which require wholesale hardware replacements. As new standards and services evolve and broadband networks become increasingly virtualized, we expect we will be able to deliver additional capabilities as software-only updates.
- *Line cards.* Our customers may also purchase additional bandwidth in the form of our upstream and downstream line cards. Our line card expansion options allow our customers to rapidly add new service interfaces and physical connection capacity without the need for chassis replacements. In addition, our expansion cards can cost-effectively enable support for our distributed access solutions utilizing the same C100G CCAP chassis.

Fixed-Line Broadband

Optical Access Solutions

- Along with our centralized and distributed deployment solutions, we offer a portfolio of Passive Optical Network (or PON) solutions for centralized and distributed PON architectures that enable service providers to move fiber closer to the network edge and deliver a broader range of ultra-broadband services more efficiently and at higher speed. Our PON solutions include next generation 10G EPON and XGS PON alternatives, including optical line terminals and optical network units. We also offer a DOCSIS Provisioning over Ethernet system for seamless integration of our PON solutions with existing DOCSIS network protocols.

Virtualized Broadband Network Gateway Router and Multiservice Router

- Our virtualized broadband network gateway, or vBNG, router provides advanced subscriber management and routing capabilities in a cloud-native, virtualized solution. By separating the control and data plane functions, our vBNG enables elastic scaling and service agility, while allowing the service provider to put the control and data planes where they make most sense. Accordingly, our vBNG can be deployed in either centralized architectures (on the same server in the data center or central office) or distributed ones (at the network edge or node closer to the end user). Our vBNG is deployed as a service on our Axyom NFV Framework. It is convergence ready with built-in access gateway functions, or AGF, interfacing with our 5G core. We support data plane slicing based on service (converged/legacy) with dynamic control of the slice from our 5G core. At the 2019 Broadband World Forum, we demonstrated how our vBNG and 5G core could enable subscribers to use services seamlessly as they move between mobile and fixed connectivity. This solution won us the Broadband Forum Innovation Award for 5G in 2019.
- Our fixed-line portfolio includes our dis-aggregated Multi-Service Router, or MSR. Our MSR is built on commercial off-the-shelf switching platforms that use merchant silicon. Our MSR supports the BNG data plane on merchant silicon. It offers industry-leading throughput and capacity in a one rack-unit form factor. Our MSR operates with the vBNG control plane being separated on a server at any centralized location or integrated right within the switch CPU. Service providers therefore can pick and choose the type of data plane at each location based on scale and throughput needs. Our MSR is also a full-fledged Provider Edge, or PE,

router. It supports layer 2 multi-protocol layer switching and layer 3 virtual private networks with resource reservation protocol for traffic engineering and Fast Re-route, a technology to provide fast traffic recovery upon link or router failures for mission critical services. It also supports edge access functions. Our MSR therefore offers the functionality of a BNG, PE Router, and Top-of-Rack switch all rolled into one.

- Our customers use our vBNG to support their next-gen PON and multi-access edge computing deployments. As an example, we demonstrated an end-to-end solution using our G.fast DPUs and 10G XGS-PON ONTs working with our XGS-PON OLT-A product connecting to a multi-tenant vBNG. This solution offers a smooth migration path for telecommunications providers from digital subscriber line, or DSL, technologies to G.fast to fiber-to-the-home, while maintaining the same vBNG edge functions. Multi-tenancy allows customers to slice the same hardware infrastructure at the edge to different access methods based on service needs.

Fiber Extension (Fiber-To-The-Distribution-Point “FTTdp”)

- Our Fiber Extension (or FTTdp) solutions allow service providers to extend the fiber running in the street or basement, utilizing the copper lead-ins at an end user’s premises. The solution consists of a distribution point unit, or DPU, which is installed outside of the home or in the basement of a multi-dwelling unit and a Network Connection Device, or NCD, which is installed inside the home. Our DPUs are reverse powered from the NCD when there is no power source available at the location of the DPU and where installing local power is costly and time consuming for the service provider. Our FTTdp solutions offer a cost- and time-effective means to provide a fiber-to-the-home experience to the end user and the operator, reducing time delays and cost overruns where the fiber penetration into buildings becomes problematic. Our portfolio focuses on cost optimization for service providers, with solutions ranging from software through to accessories that enhance the installation process.

Residential Broadband

- We sell residential broadband gateways for customer premises in Australia and New Zealand. We added these devices to our product portfolio from our acquisition of NetComm. These devices allow customers to connect to very high-speed DSL, or asymmetric DSL, or fiber services including fiber-to-the-node, -basement, and -home services when available. Our fixed broadband devices range from entry level gateways to high-performance devices that support triple-play services covering high-speed data transmission, multi-HD/4K IPTV and over-the-top video streaming, as well as high quality VoIP phone calls. We combine the latest generations of Wi-Fi with our powerful CloudMesh portfolio of Wi-Fi mesh hardware, automated Wi-Fi optimization software and Wi-Fi analytics. These options ensure fast and reliable connections to multiple devices throughout the home and office, while also optimizing costs for the operator by reducing support call loading.

Machine-to-Machine (M2M) and Industrial Internet of Things (IIoT)

- Our M2M and IIoT routers provide businesses and governments with networking products that are enabled for 3G and 4G/LTE data communication. We designed these routers for applications such as retail, transportation, health, metering digital signage, security, banking and mining. These solutions enable remote diagnostics, real-time monitoring, and wireless access via the Internet. Our routers are designed to withstand harsh environmental conditions and extreme temperatures. Dual file-system management enhances solution reliability, while integrated open-source software development kits enable customers to customize our routers for specific-use cases.

Our Customers

Our solutions are commercially deployed in over 70 countries by more than 475 customers, including some of the world’s largest Tier 1 CSPs, serving millions of subscribers:

- in North America: Charter Communications, Rogers, Videotron, Sprint, Verizon, AT&T, Bell Canada, Cable One, Mediacom, and Lumen;
- in Latin America: Televisa/IZZI Mexico, Megacable Mexico, Cablevision Argentina, Net Brazil, America Móvil and Claro Colombia;

- in Europe: Liberty Global, Vodafone, Telefonica and DNA Oyj; and
- in Asia-Pacific: SCSK Corporation, Jupiter Communications, Beijing Gehua CATV Networks, China Mobile, NBN and Softbank.

Sales and Marketing

We sell our solutions and services through our direct sales force and in partnership with our resellers and sales agents. Our sales force is supported by our sales engineering team, which has deep technical expertise and the capability for product presentations, product evaluations, trials and customer care. Each sales team is responsible for specific direct end-customer accounts and/or a geographic territory across the following regions: North America, Latin America, Asia-Pacific and Europe, Middle East and Africa.

Our products typically have a long sales cycle, requiring detailed discussions with prospective customers about their network requirements and technology roadmaps. To help us succeed in a market characterized by long sales cycles, we have developed strong customer relationships, which in turn provide us with insight into how our products will be deployed in our customers' networks. We involve product engineers in the sales process, enabling them to build relationships with customers that are valuable both during implementation and in post-sales customer support. These relationships also provide us with opportunities to leverage our familiarity with our customers' needs to make additional sales following the initial sale.

We also use resellers to market, sell and support our products and services, and we use sales agents to assist our direct global sales force with certain customers, primarily in the Latin America and Asia-Pacific regions.

Our marketing activities consist primarily of technology conferences, web marketing, trade shows, seminars and events, public relations, analyst relations, demand generation and direct marketing. We undertake our marketing activities to build our brand, increase customer awareness, communicate our product advantages, and generate qualified leads for our direct sales force, as well as our resellers and sales agents.

Competition

The CSP market is highly competitive and subject to rapidly changing technology trends and shifting customer needs.

We primarily compete with larger and more established companies in the CSP market, such as Adtran, Cisco, CommScope, Ericsson, Huawei, Inseego, Nokia and Samsung.

The principal factors upon which we compete are:

- product capabilities;
- performance, scalability, flexibility and adaptability to new standards;
- ability to innovate;
- time to market;
- customer support; and
- total cost of ownership relative to performance and features.

We believe that we compete favorably with respect to these factors. Nevertheless, many of our competitors have substantial competitive advantages, including greater name recognition, longer operating histories, and substantially greater financial, technical, research and development or other resources than we do.

Research and Development

Our research and development efforts are focused on developing new broadband solutions for the fixed, wireless and cable communications markets and enhancing our current solutions to meet the current and future needs of our customers. We aim to be first to market with deployable, innovative solutions. We are willing to invest early in research and development and take technological risks to meet these goals. We also seek to enhance our technological innovation through our partnerships with industry standard-setting organizations and groups, such as CableLabs, 3GPP, and Wi-Fi Alliance. These efforts position us to be able to advance industry standards while evolving our solutions to meet those new standards.

Manufacturing

We partner with multiple global contract manufacturing companies to manufacture the hardware for our solutions using the designs, components and standards that we specify. We conduct final assembly and quality assurance testing at our in-house and outsourced manufacturing facilities. We believe our combination of in-house and outsourced manufacturing capabilities, assembly and quality assurance testing allows us to maintain consistent and quality product for our customers. We also believe that this manufacturing model enables us to respond quickly to technological changes and supports our engineering goal of being first to market with deployable products. We believe our inventory management enables us to offer shorter times between order and delivery to our customers as compared to our competitors.

Our use of multiple contract manufacturers allows us not to be substantially dependent on the availability of any single contract manufacturer. Our contract manufacturers purchase the materials and components for our solutions through a variety of major electronics suppliers. The majority of material and component inputs for our solutions are generally available in adequate quantities from multiple suppliers.

Backlog

A portion of our customer shipments in any fiscal period relate to orders received in prior fiscal periods. This occurs when orders are received late in any fiscal period or when orders for our products exceed our manufacturing capacity. We are generally able to convert our backlog into revenue within one to two quarters, although revenue conversion may take longer. As of December 31, 2020 and 2019, we had a backlog of \$158.1 million and \$52.0 million, respectively. Of the amount of backlog as of December 31, 2020, we expect that approximately \$130.4 million will be shipped within the following twelve months. However, because our customers utilize purchase orders containing non-binding purchase commitments, and customers may cancel, change or reschedule orders without penalty at any time prior to shipment, we have no assurance that we will be able to convert our backlog into shipped orders and ultimately into revenue.

Intellectual Property

Our success depends to a significant degree upon our ability to protect our core technology and intellectual property. To accomplish this, we rely on a combination of trade secrets, patents, copyrights and trademarks, as well as contractual protections. To date, we have focused our efforts to protect our intellectual property primarily on trade secrets.

We have obtained or applied for patents and have registered or applied for trademarks and service marks in the United States and in many foreign countries. At January 31, 2021, we held seven U.S. patents, with expiration dates through 2039, and had multiple patent applications pending with the U.S. Patent and Trademark Office. We have also registered or applied to register various trademarks and service marks in the United States and a number of foreign countries, including for Casa Systems, NetComm and our four-triangle pyramid logo.

We limit access to and use of our proprietary software, technology and other confidential information through the use of internal and external controls, including nondisclosure agreements with employees, consultants, customers and vendors and other measures for maintaining trade secret protection. We generally license our software to customers pursuant to agreements that impose restrictions on their ability to use the software, including prohibitions on reverse engineering and limitations on the use of copies. We also seek to avoid disclosure of our intellectual property by requiring employees and consultants with access to our proprietary information to execute nondisclosure and assignment of intellectual property agreements and by restricting access to our source code.

We also incorporate a number of third-party software programs into our solutions pursuant to license agreements. Our software is not substantially dependent on any third-party software, although in some cases it utilizes open source code.

Human Capital and Empowerment

Our company was founded on the principle that people are our greatest asset. We pride ourselves on our culture of innovation, which is driven by our management team of experienced executives and engineers with deep industry expertise. Our future success depends in large part on the continued service of our key technical and senior management personnel, and on our ability to continue to attract, retain and motivate qualified employees, particularly highly-skilled engineers involved in the design, development, support and manufacture of new and existing products. In order for us to attract the best talent, we aim to offer challenging work in an environment that enables our employees to learn, grow and reach their full potential.

Core to our empowerment strategy is embracing diversity and building a culture of inclusion across the organization. We are working to achieve this by expanding the diversity of our workforce, creating growth and development opportunities for our employees, embracing different perspectives and fostering an inclusive work environment for all.

As of December 31, 2020, we employed 993 full-time employees, of which 344 were located in the United States and 649 were located outside the United States. Our workforce as of December 31, 2020 consisted of 624 employees in engineering and research and development, 179 employees in sales and marketing, 90 employees in general and administrative, 61 employees in manufacturing and 39 employees in services and support. None of our employees are represented by unions. We consider our relationship with our employees to be good and have not experienced any interruptions of operations due to labor disagreements.

Our human capital resource objectives include identifying, recruiting, retaining, incentivizing and integrating our existing and future employees. We strive to attract and retain the most talented employees in the industry and across the globe by offering competitive compensation and benefits that support their health, financial and emotional well-being. Our compensation philosophy is based on rewarding each employee's individual contributions and striving to achieve equal pay for equal work regardless of gender, race or ethnicity. We use a combination of fixed and variable pay including base salary, bonuses, and stock-based compensation. The principal purposes of our equity incentive plans are to attract, retain and motivate selected employees and directors through the granting of stock-based compensation awards. We offer employees benefits that vary by country and are designed to meet or exceed local laws and to be competitive in the marketplace. Examples of benefits offered in the U.S. include a 401(k) plan with employer matching contributions; health benefits; life, business travel and disability insurance; additional voluntary insurance; paid time off and parental leave; paid counseling assistance; child and elder care assistance; family college planning and corporate discounts. For further information concerning our equity incentive plans, see Note 13, *Stock-based Compensation*, of the Notes to Consolidated Financial Statements contained in Part II, Item 8 of this Annual Report on Form 10-K.

We conduct annual assessments that review department goals to identify talent needs, assess how each division is positioned from a talent perspective, review the current state of talent vitality for each department, review key talent segments and prioritize actions to identify and develop talent. We regularly consider succession plans and focus on promoting internal talent to help grow our employees' careers. We encourage all employees to never stop learning through "Casa Systems University", an on-line platform offering our employees continued learning on various technology and business topics.

Our Corporate Information

We were incorporated in the State of Delaware on February 28, 2003. Our principal executive offices are located at 100 Old River Road, Andover, Massachusetts 01810, and our telephone number at that address is (978) 688-6706.

Available Information

We maintain an internet website at www.casa-systems.com and make available free of charge through our website our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act of 1934, or the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the Securities and Exchange Commission, or the SEC. You can review our electronically filed reports and other information that we file with the SEC on the SEC's web site at <http://www.sec.gov>. We also make available, free of charge on our website, the reports filed with the SEC by our executive officers, directors and 10% stockholders pursuant to Section 16 under the Exchange Act as soon as reasonably practicable after copies of those filings are provided to us by those persons. In addition, we regularly use our website to post information regarding our business, product development programs and governance, and we encourage investors to use our website, particularly the information in the section entitled "Investor Relations," as a source of information about us.

The information on our website is not incorporated by reference into this Annual Report on Form 10-K and should not be considered to be a part of this Annual Report on Form 10-K. Our website address is included in this Annual Report on Form 10-K as an inactive technical reference only.

Item 1A. Risk Factors.

Our business is subject to numerous risks. The following important factors, among others, could cause our actual results to differ materially from those expressed in forward-looking statements made by us or on our behalf in this Annual Report on Form 10-K and other filings with the Securities and Exchange Commission, or the SEC, press releases, communications with investors, and oral statements. Actual future results may differ materially from those anticipated in our forward-looking statements. We undertake no obligation to update any forward-looking statements, whether as a result of new information, future events, or otherwise.

Risks Related to Our Market

Risks Related to Market Dynamics

We believe the CSP industry is in the early stages of a major architectural shift toward the virtualization of networks and the use of networks with distributed architectures. If the architectural shift does not occur, if it does not occur at the pace we predict, or if the products and services we have developed are not attractive to our customers after such shift takes place, our revenues could decline.

We believe the CSP industry is in the early stages of transitioning to the virtualization of networks and the use of networks with distributed architectures. We are developing products and services that we believe will be attractive to our customers and potential customers who make that shift. Our strategy depends in part on our belief that the industry shift to a software-centric cloud-based architecture and increasing densification will continue. In our experience, fundamental changes like this often take time to accelerate, and the adoption rates of our customers may vary. As our customers determine their future network architectures and how to implement them, we may encounter delayed timing of orders, deferred purchasing decisions and reduced expenditures. These longer decision cycles and reduced expenditures may negatively impact our revenues or make it difficult for us to accurately predict our revenues, either of which could materially adversely affect our business, financial condition, results of operations and prospects. Moreover, it is possible that our customers may reverse or fail to expand upon current trends toward virtualization and distributed architectures, which could result in significantly reduced demand for the products that we have developed and currently plan to develop.

If we do not successfully anticipate technological shifts, market needs and opportunities, and develop new products and product enhancements that meet those technological shifts, needs and opportunities, we may not be able to compete effectively.

The CSP market, including fixed and wireless, is characterized by rapid technological shifts and increasingly complex customer requirements to achieve scalable networks that accommodate rapidly increasing consumer demand for bandwidth. To compete effectively, we must continue to develop new technologies and products that address emerging technological trends and changing customer needs. The process of developing new technology is complex and uncertain, and the development of new offerings requires significant upfront investment that may not result in material improvements to existing products or result in marketable new products or costs savings or revenue for an extended period of time, if at all.

We believe that our culture of innovation is a significant factor in our ability to develop new products. If we are not able to attract and retain employees that are able to contribute to our culture of innovation, our ability to identify emerging technological trends and changing customer needs and successfully develop new products to address them could be adversely impacted.

The success of new products and enhancements also depends on many other factors, including timely completion and introduction, differentiation from products offered by competitors and previous versions of our own products and, ultimately, market acceptance of these new products and enhancements. In addition, new technologies or standards could render our existing products obsolete or less attractive to customers. If we are unable to successfully introduce new products and enhancements, we would not be able to compete effectively and our business, financial condition, results of operations and prospects could be materially adversely affected.

Our success depends in large part on CSPs' continued deployment of, and investment in, ultra-broadband network capabilities and technologies that make use of our solutions.

Our solutions are dedicated to enabling cable, wireless and fixed-line service providers to deliver voice, video and data services over newer and faster ultra-broadband networks. As a result, our success depends significantly on these service

providers' continued deployment of, and investment in, their networks, which depends on a number of factors outside of our control. These factors include capital constraints, the presence of available capacity on legacy networks, perceived subscriber demand for ultra-broadband networks, competitive conditions within the CSP industry and regulatory issues. If CSPs do not continue deploying and investing in their ultra-broadband networks in ways that involve our solutions, for these or other reasons, our business, financial condition, results of operations and prospects could be materially adversely affected.

Our continued growth depends on the pace and level of investment in 5G and 5G-related technologies.

We believe the CSP industry is in the early stages of a major architectural shift toward technologies and products related to 5G that include cloudification, virtualization, micro networks or network slicing, network densification, and 5G New Radio, or 5G NR, among others. We have invested heavily in products and solutions in these areas as we believe that they will represent significant future revenue and profitability for us. As 5G entails a fundamental shift in the way that fixed and wireless broadband communications markets are architected, the time required by our customers to evaluate and ultimately adopt 5G may be quite extended. If the adoption of 5G by our customers does not occur at the pace we predict, if our 5G products are not successful, or if our customers fail to make significant investments in 5G, our revenues could decline and our business, financial condition, results of operations, and prospects could be materially adversely impacted.

We have invested heavily in developing wireless and fixed-line broadband solutions, and we face risks in seeking to expand our platform into the wireless and fixed-line broadband markets.

We have invested heavily in developing wireless and fixed-line solutions that are at an early stage of generating revenue. We cannot guarantee that these investments, or any of our other investments in research and development, will ever generate material revenue or become profitable for us, and the failure of these investments to generate positive returns may adversely impact our business, financial condition, results of operations and prospects. The wireless market makes up a substantial portion of our total potential addressable market. In addition, expanding our offerings into the wireless and fixed-line broadband markets presents other significant risks and uncertainties, including potential distraction of management from other business operations that generate more substantial revenue, the dedication of significant research and development, sales and marketing, and other resources to this new business line at the expense of our other business operations, and other risks that we may not have adequately anticipated.

Adverse economic conditions or reduced broadband infrastructure spending may adversely affect our business, financial condition, results of operations and prospects.

Our business depends on the overall demand for broadband connectivity. Weak domestic or global economic conditions, fear or anticipation of such conditions or a reduction in broadband infrastructure spending even if economic conditions improve, could materially adversely affect our business, financial condition, results of operations and prospects in a number of ways, including longer sales cycles, lower prices for our products and services, reduced sales, and lower or no growth. Continued turmoil in the geopolitical environment in many parts of the world may also affect the overall demand for our products and services. Deterioration in global economic or political conditions could materially adversely affect our business, financial condition, results of operations and prospects in the future. A prolonged period of economic uncertainty or a downturn may also significantly affect the availability of capital and the terms and conditions of financing arrangements, including the overall cost of financing as well as the financial health or creditworthiness of our customers. Circumstances may arise in which we need, or desire, to raise additional capital, and such capital may not be available on commercially reasonable terms, or at all.

Regulations affecting broadband infrastructure could reduce demand for our products.

Laws and regulations governing the Internet and electronic commerce are emerging but remain largely unsettled, even in the areas where there has been some legislative action. Regulations may focus on, among other things, assessing access or settlement charges, or imposing tariffs or regulations based on the characteristics and quality of products, either of which could restrict our business or increase our cost of doing business. Government regulatory policies are likely to continue to have a major impact on the pricing of existing and new network services and, therefore, are expected to affect demand for those services and the communications products, including our products, supporting those services.

Any changes to existing laws or the adoption of new regulations by federal or state regulatory authorities or any legal challenges to existing laws or regulations affecting IP networks could materially adversely affect the market for our products. Moreover, customers may require us, or we may otherwise deem it necessary or advisable, to alter our products to address actual or anticipated changes in the regulatory environment. Our inability to alter our products or address any regulatory changes could have a material adverse effect on our consolidated financial position, results of operations or cash flows.

We face intense competition, including from larger, well-established companies, and we may lack sufficient financial or other resources to maintain or improve our competitive position.

The market for broadband infrastructure solutions is intensely competitive, and we expect competition to increase in the future from established competitors and new market entrants. This competition could result in increased pricing pressure, reduced profit margins, increased selling, general and administrative expenses, and loss of or stagnant market share, any of which could materially adversely affect our business, financial condition, results of operations and prospects.

In the CSP market, we primarily compete with larger and more established companies, such as Adtran, Cisco, CommScope, Ericsson, Huawei, Inseego, Nokia and Samsung.

Many of our existing and potential competitors enjoy substantial competitive advantages, such as:

- greater name recognition and longer operating histories;
- larger sales and marketing budgets and resources;
- broader distribution and established relationships with customers;
- greater access to larger customer bases;
- greater customer support resources;
- greater manufacturing resources;
- the ability to leverage their sales efforts across a broader portfolio of products;
- the ability to leverage purchasing power with vendor subcomponents;
- the ability to incorporate additional functionality into their existing products;
- the ability to bundle offerings with other products and services;
- the ability to set more aggressive pricing policies;
- lower labor and development costs;
- greater resources to fund research and development or otherwise acquire new product offerings;
- larger intellectual property portfolios; and
- substantially greater financial, technical, research and development or other resources.

Our ability to compete will depend upon our ability to provide a comparable or better solution than our competitors at a price that offers superior value. We may be required to make substantial additional investments in research, development, sales and marketing in order to respond to our competition.

We also expect increased competition if our market continues to expand. Conditions in our market could change rapidly and significantly as a result of technological advancements or other factors. Current or potential competitors may be acquired by third parties that have greater resources available than we do. Our current or potential competitors might take advantage of the greater resources of the larger organizations resulting from these acquisitions to compete more vigorously or broadly with us. In addition, continued industry consolidation might adversely affect customers' perceptions of the viability of smaller and even medium-sized companies, such as us, and, consequently, customers' willingness to purchase from us. Further, certain large customers may develop broadband infrastructure solutions for internal use and/or to broaden their portfolios of internally developed resources, which could allow these customers to become new competitors in our market.

Risks Relating to Sales

Timing of large orders and seasonality in our revenue may cause our quarterly revenue and results of operations to fluctuate and possibly decline materially from quarter to quarter.

Our customers tend to make large purchases from us when initiating or upgrading services based on our solutions, followed by smaller purchases for maintenance and ongoing support. In addition, for our cable products, purchases by existing customers of capacity expansions can also involve large individual orders that may represent a significant portion of our revenue for a fiscal quarter, which may also have a significant impact on our quarterly gross margin due to these capacity expansions generating higher gross margins than our initial hardware-based deployments. As a result of all of these factors,

our quarterly revenue and results of operations, including our gross margin, may be significantly impacted by one or a small number of large individual orders. For example, any cancellation of orders or any acceleration or delay in anticipated product purchases or the acceptance of shipped products by a large customer could materially affect our revenue and results of operations in any quarterly period. We may be unable to sustain or increase our revenue from other new or existing customers to offset the discontinuation of purchases by one of our larger customers. As a result, our quarterly revenue and results of operations are difficult to estimate and may fluctuate or decline materially from quarter to quarter.

In addition, although this was not the case for the year ended December 31, 2020, historically there have been significant seasonal factors which may cause revenue to be greater for the first and fourth quarters of our fiscal year as compared to the second and third quarters. We believe that this seasonality results from a number of factors, including the procurement, budgeting and deployment cycles of many of our customers. These seasonal variations may cause our quarterly revenue and results of operations to fluctuate or decline materially from quarter to quarter.

Our sales to the CSP market are volatile and our sales cycles can be long and unpredictable. As a result, our sales and revenue are difficult to predict and may vary substantially from period to period, which may cause our revenue and results of operations to fluctuate and possibly decline significantly.

Our sales to the CSP market have been characterized by large and sporadic purchases and long sales cycles. Sales activity often depends upon the stage of completion of expanding network infrastructures, the availability of funding and the extent to which CSPs are affected by regulatory, economic and business conditions in the countries in which they operate.

In addition, the timing of our sales and revenue recognition is difficult to forecast because of the unpredictability of our products' sales cycles. A sales cycle is the period between initial contact with a prospective customer and the sale of our products to that customer. Customer orders often involve the purchase of multiple products. These orders are complex and difficult to obtain because prospective customers generally consider a number of factors over an extended period of time before committing to purchase the products and solutions we sell. Customers, especially in the case of our large customers, often view the purchase of our products as a significant and strategic decision and require considerable time to evaluate, test and qualify our products prior to making a purchase decision and placing an order. The length of time that customers devote to their evaluation, contract negotiation and budgeting processes varies significantly, but can often exceed 24 months. During the sales cycle, we expend significant time and money on sales and marketing activities and make investments in evaluation equipment, all of which are included in our selling, general and administrative expenses and lower our operating margins, particularly if no sale occurs.

Even if a customer decides to purchase our products, there are many factors affecting the timing of our recognition of revenue, which makes our revenue difficult to forecast. For example, the sale of our products may be subject to acceptance testing or there may be unexpected delays in a customer's internal procurement processes, particularly for some of our larger customers, for whom our products represent a very small percentage of their total procurement activity. These factors may result in our inability to recognize revenue for months, or in some rare instances, for years following a sale. In addition, other factors that are specific to particular customers can affect the timing of their purchases and the variability of our revenue recognition, including the strategic importance of a particular project to a customer, budgetary constraints and changes in their personnel. For all of these reasons, it is difficult to predict whether a sale will be completed, the particular period in which a sale will be completed and the period in which revenue from a sale will be recognized. If our sales cycles lengthen, our revenue could be lower than expected, which could have a material adverse effect on our business, financial condition, results of operations and prospects.

We are exposed to the credit risk of some of our customers and to credit exposures in the event of turmoil in the credit markets, which could result in material losses.

Due to our reliance on significant customers, we are dependent on the continued financial strength of these customers. If one or more of our significant customers experience financial difficulties, it could result in uncollectible accounts receivable and our loss of these customers and anticipated revenue.

The majority of our sales are on an open credit basis, with typical payment terms of 90 days or less. We monitor individual customer payment capability in granting such open credit arrangements, seeking to limit such open credit to amounts we believe our customers can pay and maintain reserves we believe are adequate to cover exposure for doubtful accounts. However, there can be no assurance that our open credit customers will pay the amounts they owe to us or that the reserves we maintain will be adequate to cover such credit exposure. Our customers' failure to pay and/or our failure to maintain sufficient reserves could have a material adverse effect on our consolidated financial statements. In addition, in the event that turmoil in the credit markets makes it more difficult for some customers to obtain financing, those customers'

ability to pay could be adversely impacted, which in turn could have a material adverse impact on our business and operations.

A portion of our sales is also derived through our resellers, which tend to have more limited financial resources than other customers and to present increased credit risk. Our resellers also typically have the ability to terminate their agreements with us for any reason upon advance written notice.

Risks Relating to Concentration of Our Business

We expect certain of our customers will continue to represent a substantial portion of our revenue.

Historically, certain of our customers have accounted for a significant portion of our revenue. For example, sales to National Broadband Network represented 20% and 12% of our revenue for the years ended December 31, 2020 and 2019, respectively; sales to AT&T represented 11% of our revenue for the year ended December 31, 2020; Charter Communications accounted for 14%, and 27% of our revenue for the years ended December 31, 2019 and 2018, respectively; sales to Liberty Global Affiliates accounted for 11% of our revenue for the year ended December 31, 2018; sales to Videotron accounted for 14% of our revenue for the year ended December 31, 2018; and sales to Rogers accounted for 12% of our revenue for the year ended December 31, 2018. Based on their historical purchasing patterns, we expect that our large customers will continue to account for a substantial portion of our revenue in future periods. However, we are party to ordinary course agreements with most of customers. These agreements generally do not include binding annual purchasing commitments, and actual purchases can vary significantly from year to year. The fact that a customer represents a significant percentage of revenue in any given year does not guarantee or imply that the same customer will represent a similar or greater percentage of revenue in any future year. Additionally, our customers generally make purchases from us on a purchase-order basis rather than pursuant to long-term contracts, and those that do enter long-term contracts typically have the right to terminate their contracts for convenience. As a result, we generally have no assurances that these large customers will continue to purchase our solutions. We may also see consolidation of our customer base, which could result in loss of customers. In addition, some of our large customers have used, and may in the future use, the sizes and relative importance of their orders to our business to require that we enter into agreements with more customer-favorable terms than we would otherwise agree to and obtain price concessions. The loss of a significant customer, a significant delay or reduction in purchases by large customers or significant price concessions to one or more large customers could have a material adverse effect on our business, financial condition, results of operations and prospects.

If we are unable to sell additional products to our existing customers, our revenue will be adversely affected.

To increase our revenue, we must sell additional products to our existing customers and add new customers. We expect that a substantial portion of our future sales will be follow-on sales to existing customers. For example, one of our sales strategies is to target sales of capacity expansions and implementation of wireless solutions at our current cable customers because they are familiar with the operational and economic benefits of our solutions. However, our existing customers may choose to use other providers for their infrastructure needs. If we fail to sell additional products to our existing customers, our business, financial condition, results of operations and prospects could be materially adversely affected.

We may have difficulty attracting new large customers or acquiring new customers due to the high costs of switching broadband equipment.

CSPs typically need to make substantial investments when deploying network infrastructure, which can delay a purchasing decision. Once a CSP has deployed infrastructure for a particular portion of its network, it is often difficult and costly to switch to another vendor's infrastructure. Unless we are able to demonstrate that our products offer significant performance, functionality or cost advantages that outweigh a customer's expense of switching from a competitor's product, it will be difficult for us to generate sales once that competitor's equipment has been deployed. Accordingly, if a customer has already deployed a competitor's product for its broadband infrastructure, it may be difficult for us to sell our products to that customer. If we fail to attract new large customers or acquire new customers, our business, financial condition, results of operations and prospects could be materially adversely affected.

Our converged cable access platform, or CCAP, solutions currently represent a significant percentage of our product sales; our business would be adversely affected in the event we are unable to sell one or more of our CCAP products.

Historically, we have generated the majority of our revenue from the cable market with our converged cable access platform, or CCAP. In 2019, as we became more diversified via expansion of our target markets to include wireless and fixed-line broadband solutions, and following our acquisition of NetComm, the share of wireless and fixed-line products in our revenue mix has increased. However, even as our business expands increasingly into wireless and fixed-line broadband

solutions, we remain heavily dependent upon the sales of our CCAP solutions. In the event we are unable to market and sell these products or any future product that represents a substantial amount of our revenue, our business, financial condition, results of operations and prospects could be materially adversely affected.

Risks Related to Our International Dealings

We generate a significant amount of revenue from sales to customers outside of the United States and have increased geographic diversity of our revenues following the acquisition of NetComm; 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 revenue from sales to customers in Asia-Pacific, Europe and Latin America. Our ability to grow our business and our future success will depend to a significant extent on our ability to continue to expand our operations and customer base worldwide. To this end, in the third quarter of 2019, we completed the acquisition of NetComm, an Australian public company.

As a result of our international reach, we must hire and train experienced personnel to staff and manage our foreign operations. To the extent that 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 in sales productivity in foreign markets. We also enter into strategic relationships with resellers and sales agents in certain international markets where we do not have a local presence. If we are not able to maintain these relationships or to recruit additional companies to enter into reseller and sales agent relationships, our future success in these international markets 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 customer contracts. To the extent that we may enter into customer contracts in the future that include non-standard terms related to payment, warranties or performance obligations, our business, financial condition, results of operations and prospects could be materially adversely affected.

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

- greater risk of unexpected changes in regulatory practices, tariffs and tax laws and treaties;
- greater difficulty in enforcing contracts and accounts receivable collection and longer collection periods;
- increased expenses incurred in establishing and maintaining our international operations;
- fluctuations in exchange rates between the U.S. dollar and foreign currencies where we do business;
- greater difficulty and costs in recruiting local experienced personnel;
- wage inflation in certain growing economies;
- general economic and political conditions in these foreign markets;
- economic uncertainty around the world as a result of sovereign debt issues;
- communication and integration problems resulting from cultural and geographic dispersion;
- limitations on our ability to access cash resources in our international operations;
- ability to establish necessary business relationships and to comply with local business requirements;
- risks associated with trade restrictions and foreign legal requirements, including the importation, certification and localization of our products required in foreign countries;
- the uncertainty of protection for intellectual property rights in some countries;
- delays resulting from our need to comply with foreign cybersecurity laws;
- greater risk of a failure of our operations and employees to comply with both U.S. and foreign laws and regulations, including antitrust regulations; the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA; privacy and data protection laws and regulations and any trade regulations ensuring fair trade practices; and

- heightened risk of unfair or corrupt business practices in certain geographies and of improper or fraudulent sales arrangements that may impact financial results and result in restatements of, or irregularities in, financial statements.

These and other factors could harm our ability to gain future international revenue and, consequently, materially adversely affect our business, financial condition, results of operations and prospects. 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, financial condition, results of operations and prospects.

We have significant operations in China, where many of the risks listed above are particularly acute. Import tariffs and other restrictions imposed by the U.S. government and related retaliatory action taken by China could significantly increase, among other things, which could cause an increase in the costs of raw materials, manufacturing of our products and costs for goods imported into the United States, all of which could have a material adverse effect on our business and results of operations. Any such trade barriers could reduce customer demand for our products if our customers have to pay increased prices for our products as a result of such policies. In addition, such policies may have a similar impact on other suppliers and certain customers, which could increase the negative impact on our operating results or future cash flows. Although we have not experienced a significant increase in the cost of our operations, if we were to do so, our products could become less competitive than those of our competitors whose imports are not subject to these trade policies.

In 2019 and 2018, the Office of the United States Trade Representative, or USTR, imposed significant new tariffs on a wide variety of Chinese products, including certain of our products, pursuant to Section 301 of the Trade Act of 1974. USTR has imposed significant additional tariffs on Chinese products, effective at various dates from July 6, 2018 through September 1, 2019. Effective February 14, 2020, certain of these tariffs were reduced or suspended, however, there continues to be significant uncertainty in connection with tariff matters. In the event that any existing tariffs are increased, or any additional tariffs are imposed on our products, or that our products become subject to any other trade barriers or restrictions, our business, financial condition, our results of operations and commercial prospects could be materially and adversely affected.

We rely on resellers and sales agents to sell our products into certain international markets, and the loss of such resellers and sales agents could delay or harm our ability to deliver our products to our customers.

We rely upon resellers and sales agents to coordinate sales and distribution of our products in certain international markets. We provide our resellers and sales agents with specific training and programs to assist them in selling our products, but these steps may not be effective. In addition, our resellers and sales agents may be unsuccessful in marketing, selling and supporting our products and services. If we are unable to develop and maintain effective sales incentive programs for our resellers and sales agents, we may not be able to incentivize these resellers and sales agents to sell our products to customers. Any of our resellers and sales agents could elect to consolidate or enter into a strategic partnership with one of our competitors, which could reduce or eliminate our future opportunities with that reseller or sales agent. Our agreements with our resellers and sales agents may generally be terminated for any reason by either party with advance notice. We may be unable to retain these resellers and sales agents or secure additional or replacement resellers and sales agents. The replacement of one or more of our significant resellers or sales agents requires extensive training, and any new or expanded relationship with a reseller or sales agent may take several months or more to achieve productivity. Any of these events could materially adversely affect our business, financial condition, results of operations and prospects.

We are subject to governmental export and import controls and similar restrictions that could impair our ability to compete in international markets or subject us to liability if we violate them.

Our products may be subject to various export controls and because we incorporate encryption technology into certain of our products, certain of our products may be exported from various countries only with the required export license or through an export license exception. Furthermore, certain export control and economic sanctions laws prohibit the shipment of certain products, technology, software and services to embargoed countries and sanctioned governments, entities, and persons. If we fail to comply with the applicable export control laws, customs regulations, economic sanctions or other applicable laws, we could be subject to monetary damages or the imposition of restrictions which could materially adversely affect our business, financial condition, results of operations and prospects and could also harm our reputation. Further, there could be criminal penalties for knowing or willful violations, including incarceration for culpable employees and managers. Obtaining the necessary export license or other authorization for a particular sale may be time-consuming and may result in the delay or loss of sales opportunities.

In addition, various countries regulate the importation of certain encryption technology and products, including through import permit and license requirements, and have enacted laws that could limit our ability to distribute our products or could limit our customers' ability to implement our products in those countries. Any change in export or import regulations, economic sanctions or related legislation, shift in the enforcement or scope of existing regulations, or change in the countries, governments, persons or technologies targeted by such regulations could result in decreased use of our products by, or in our decreased ability to export or sell our products to, existing or potential customers with international operations or create delays in the introduction of our products into international markets. Any decreased use of our products or limitation on our ability to export or sell our products could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Relating to Solutions

Risks Related to Quality

Our products are necessary for the operation of our customers' broadband service operations. Product quality problems, warranty claims, services disruptions, or other defects, errors or vulnerabilities in our products or services could harm our reputation and materially adversely affect our business, financial condition, results of operations and prospects.

We assist our customers in the operation of their broadband service operations. Failure of our products could result in significant interruptions in our customers' capabilities to maintain their networks and operations. Further, unsatisfactory performance could cause us to lose revenue or market share, increase our service costs, cause us to incur substantial costs in analyzing, correcting or redesigning our products, cause us to lose significant customers, subject us to liability for damages and divert our resources from other tasks, any one of which could materially adversely affect our business, financial condition, results of operations and prospects.

In addition, sophisticated hardware and operating system software and applications that we produce or procure from third parties may contain defects in design or manufacture, including "bugs" and other problems that could unexpectedly interfere with the operation of our products. Such defects could result in warranty claims or claims by customers for losses that they sustain or, in some cases, could allow customers to claim damages. In the past, we have had to replace certain components of products that we had shipped or provide remediation in response to the discovery of defects or bugs from failures in software protocols.

Limitation of liability provisions in our standard terms and conditions of sale, and those of our resellers and sales agents, may not be enforceable under some circumstances or may not fully or effectively protect us from end-customer claims and related liabilities and costs. In some cases, including with respect to indemnification obligations under many of our agreements with customers and resellers, our contractual liability may be uncapped. The sale and support of our products also entail the risk of product liability claims. We maintain insurance to protect against certain types of claims associated with the use of our products, but our insurance coverage may not adequately cover any such claims. In addition, even claims that ultimately are unsuccessful could result in expenditures of funds in connection with litigation and divert management's time and other resources.

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, financial condition, results of operations and prospects.

Once our products are deployed within our customers' networks, our customers depend on our support organization to resolve any issues relating to our products. Our provision of high-quality support is critical for the successful marketing and sale of our products. If we do not assist our customers in deploying our products effectively, do not succeed in helping our customers resolve post-deployment issues quickly or do not provide adequate ongoing support, it could adversely affect our ability to sell our products to existing customers and could harm our reputation with potential customers. In addition, our standard sales contracts require us to provide minimum service requirements to our customers on an ongoing basis and our failure to satisfy these requirements could expose us to claims under these contracts. Our failure to maintain high-quality support and services, including compliance with our contractual minimum service obligations, could have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Research and Development

We may not generate positive returns on our research and development investments.

Developing our products is expensive, and the investment in product development may involve a long payback cycle or may result in investments in technologies or standards that do not get adopted in the timeframe we anticipate, or at all. For the years ended December 31, 2020, 2019 and 2018, our research and development expenses were \$84.4 million, or approximately 21.5% of our revenue, \$83.3 million, or approximately 29.5% of our revenue, and \$71.0 million, or approximately 23.9% of our revenue, respectively. We expect to continue to invest in software and hardware development in order to expand the capabilities of our fixed and wireless broadband infrastructure solutions, introduce new products and features and build upon our technology leadership, and our research and development expenses may continue to increase in absolute dollars and as a percentage of revenue from 2020 to 2021. Our investments in research and development may not generate positive returns in a timely fashion or at all.

Our products must interoperate with operating systems, software applications and hardware, and comply with industry standards, that are developed by others, and if we are unable to devote the necessary resources for our products to interoperate with such software and hardware and comply with such standards, we may lose or fail to increase market share and experience a weakening demand for our products.

Generally, our products comprise only a part of and must interoperate with our customers' existing infrastructure, specifically their networks, servers, software and operating systems, which may be manufactured by a wide variety of vendors and original equipment manufacturers. Our products must also comply with industry standards, such as Data Over Cable Service Interface Specification, or DOCSIS, 3.0 and 3.1, and standards promulgated by the 3rd Generation Partnership Project, or 3GPP, a standards organization which develops protocols for mobile technology, which are established by third parties, in order to interoperate with such servers, storage, software and other networking equipment such that all systems function efficiently together. We may depend on other vendors to support prevailing industry standards. Also, some industry standards may not be widely adopted or implemented uniformly and competing standards and other approaches may emerge that may be preferred by our customers.

In addition, when new or updated versions of these industry standards, software systems or applications are introduced, we must sometimes develop updated versions of our software so that our products will interoperate properly. We may not accomplish these development efforts quickly, cost-effectively or at all. These development efforts require capital investment and the devotion of engineering resources. If we fail to maintain compatibility with these systems and applications, our customers may not be able to adequately utilize our products, and we may lose or fail to increase market share and experience a weakening in demand for our products, among other consequences, which could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Our Operations

Risks Related to Internal Resources

Our operations have experienced rapid growth in recent years, and if we do not appropriately manage any future growth or are unable to improve our systems and processes, our business, financial condition, results of operations and prospects will be adversely affected.

We have experienced rapid growth in the scope and complexity of our operations in recent years and are investing in growing our suite of solutions for cable, fixed-line and wireless service providers. This has placed a strain on our management, administrative, operational and financial infrastructure. Our headcount increased from 743 as of December 31, 2018, to 993 as of December 31, 2020, and we anticipate continuing to increase our headcount as needed based on future growth. As we have grown, we have had to manage an increasingly larger and more complex array of internal systems and processes to scale with all aspects of our business, including our software development, contract manufacturing and purchasing, logistics and fulfillment and sales, maintenance and support. Our success will depend in part upon our ability to manage our growth effectively. To do so, we must continue to increase the productivity of our existing employees and continue to hire, train and manage new employees as needed. To manage domestic and international growth of our operations and personnel, we will need to continue to improve our operational, financial and management controls and our reporting processes and procedures and implement more extensive and integrated financial and business information systems. We may not be able to successfully implement these or other improvements to our systems and processes in an efficient or timely manner, and we may discover deficiencies in their capabilities or effectiveness. Our failure to improve our systems and processes, or their failure to operate effectively and in the intended manner, may result in disruption of our current operations and customer relationships, our inability to manage the growth of our business, and our inability to accurately forecast our

revenue, expenses and earnings.

If we are unable to hire, retain, train and motivate qualified personnel and senior management, including in particular our founders, our business, financial condition, results of operations and prospects could be adversely affected.

Our future success depends, in part, on our ability to continue to attract and retain highly skilled personnel, particularly software engineering and sales personnel. Competition for highly skilled personnel is often intense, particularly in the greater Boston region where we are headquartered, and we may not be able to attract and retain the highly skilled employees that we need to support our business. Many of the companies with which we compete for experienced personnel have greater resources than we have to provide more attractive compensation packages and other amenities. Research and development personnel are aggressively recruited by startup and growth companies, which are especially active in many of the technical areas and geographic regions in which we conduct product development. In addition, in making employment decisions, particularly in the high-technology industry, job candidates often consider the value of the stock-based compensation they are to receive in connection with their employment. Declines in the market price of our stock could adversely affect our ability to attract, motivate or retain key employees. If we are unable to attract or retain qualified personnel, or if there are delays in hiring required personnel, our business, financial condition, results of operations and prospects could be materially adversely affected.

Also, to the extent we hire personnel from competitors, or from certain customers or other third parties whose employees we have agreed not to solicit, we may be subject to allegations that such personnel have been improperly solicited, that such personnel have divulged proprietary or other confidential information or that former employers own certain inventions or other work product. Such claims could result in litigation.

Our future performance also depends on the continued services and continuing contributions of our founders and senior management to execute our business plan and to identify and pursue new opportunities and product innovations. Our employment arrangements with our employees do not require that they continue to work for us for any specified period, and therefore, they could terminate their employment with us at any time. In particular, the loss of Jerry Guo, our President and Chief Executive Officer, and Weidong Chen, our Chief Technology Officer, could have a material adverse impact on our business. Further, the loss of other members of our senior management team, sales and marketing team or engineering team, or any difficulty attracting or retaining other highly qualified personnel in the future, could significantly delay or prevent the achievement of our development and strategic objectives, which could materially adversely affect our business, financial condition, results of operations and prospects. Except with respect to Mr. Guo, we do not maintain “key person” life insurance on our officers, directors or key employees.

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

We depend on our direct sales force to increase sales with existing customers and to obtain new customers. As such, we have invested and will continue to invest substantially in our sales organization. In recent periods, we have been adding personnel to our sales function as we focus on growing our business, entering new markets and increasing our market share. 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. In addition, we have significantly increased the number of personnel in our sales and marketing departments in recent periods, with headcount growing from 142 as of December 31, 2018, to 179 as of December 31, 2020. New hires require significant training and may take significant time before they achieve full productivity. Our recent hires and planned hires may not become productive as quickly as we expect, and we may be unable to hire, retain or integrate into our corporate culture sufficient numbers of qualified individuals in the markets where we do business or plan to do business. If we are unable to hire, integrate and train a sufficient number of effective sales personnel, or the sales personnel we hire are not successful in obtaining new customers or increasing sales to our existing customer base, our business, financial condition, results of operations and prospects could be materially adversely affected.

Risks Related to Supply Chain and Inventory Management

Because we depend on third-party manufacturers to build our hardware, we are susceptible to manufacturing delays and pricing fluctuations that could prevent us from delivering customer orders on time, if at all, or on a cost-effective basis, which may result in the loss of sales and customers.

We depend on third-party contract manufacturers to manufacture our product hardware. A significant portion of our cost of revenue consists of payments to these third-party contract manufacturers. Our reliance on these third-party contract

manufacturers reduces our control over the manufacturing process, quality assurance, product costs and product supply and timing, which exposes us to risk. To the extent that our products are manufactured at facilities in foreign countries, we may be subject to additional risks associated with complying with local rules and regulations in those jurisdictions. If we are unable to manage our relationships with our third-party contract manufacturers effectively, or if these third-party manufacturers suffer delays or disruptions for any reason, experience increased manufacturing lead times, capacity constraints or quality control problems in their manufacturing operations or fail to meet our future requirements for timely delivery, our ability to ship products to our customers would be severely impaired, and our business, financial condition, results of operations and prospects could be materially adversely affected.

Our contract manufacturers typically fulfill our supply requirements on the basis of individual orders. We do not have long-term contracts with our third-party manufacturers that guarantee capacity, the continuation of particular pricing terms or the extension of credit limits. Accordingly, they are not obligated to continue to fulfill our supply requirements, which could result in supply shortages and increases in the prices for manufacturing services on short notice. We may not be able to develop alternate contract manufacturers in a timely manner, or at all. If we add or change contract manufacturers or change any manufacturing plant locations within a contract manufacturer network, we would add additional complexity and risk to our supply chain management.

In addition, we may be subject to significant challenges in ensuring that quality, processes and costs, among other issues, are consistent with our expectations and those of our customers. A new contract manufacturer or manufacturing location may not be able to scale its production of our products at the volumes or quality we require. This could also adversely affect our ability to meet our scheduled product deliveries to our customers, which could damage our customer relationships and cause the loss of sales to existing or potential customers, late delivery penalties, delayed revenue or an increase in our costs which could adversely affect our gross margins. This could also result in increased levels of inventory subjecting us to increased excess and obsolete charges that could have a negative impact on our results of operations.

Because some of the key components in our products come from limited sources of supply, we are susceptible to supply shortages or supply changes, which could disrupt or delay our scheduled product deliveries to our customers and may result in the loss of sales and customers.

Our products rely on key components that our contract manufacturers purchase on our behalf from a limited number of suppliers, including Altera, Analog Devices, Bell Power, Broadcom, Intel, Marvell, Maxim, Mini-Circuits, Qorvo, Qualcomm, Quectel, TTM Technologies and Xilinx. We do not have guaranteed supply contracts with any of our component suppliers, and our suppliers could delay shipments or cease manufacturing such products or selling them to us at any time. The development of alternate sources for those components is time-consuming, difficult and costly. If we are unable to obtain a sufficient quantity of these components on commercially reasonable terms or in a timely manner, sales of our products could be delayed or halted entirely, or we may be required to redesign our products. For example, as a result of COVID-19, certain of our components may be in short supply or may be delayed in reaching our contract manufacturers worldwide. These events could result in lost sales and damage to our customer relationships, which would adversely impact our business, financial condition, results of operations and prospects. In the event of a shortage or supply interruption from our component suppliers, we may not be able to develop alternate or secondary sources in a timely manner, on commercially reasonable terms or at all. In addition, certain of our customer contracts require us to notify our customers of any discontinuation of the products that we supply to them and to provide support for discontinued products, and lack of supply from our suppliers could leave us unable to fulfill our customer support obligations. Adverse changes to our relationships with our sole suppliers could result in lost sales and damage to our customer relationships, which would adversely impact our business, financial condition, results of operations and prospects.

We base our inventory requirements on our forecasts of future sales. If these forecasts are materially inaccurate, we may procure inventory that we may be unable to use in a timely manner or at all.

We and our contract manufacturers procure components and build our products based on our forecasts. These forecasts are based on estimates of future demand for our products, which are in turn based on historical trends and analyses from our sales and marketing organizations, adjusted for overall market conditions. To the extent our forecasts are materially inaccurate or if we otherwise do not need such inventory, we may under- or over-procure inventory, and such inaccuracies in our forecasts could subject us to contractual damages and otherwise materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Our Financial Condition

As the majority of the growth in our revenue and income from operations has occurred since 2013, it is difficult to evaluate our future prospects.

We were founded in 2003 and booked our first revenue in 2006. The majority of the growth in our revenue and income from operations has occurred during 2013 to 2017. Given the cyclical nature of our end markets, we may sometimes have difficulty evaluating our future prospects or planning for and managing future growth. We have encountered and will continue to encounter risks and difficulties frequently experienced by rapidly growing companies in constantly evolving and highly cyclical industries, including the risks described in this Annual Report on Form 10-K. During 2018 and 2019, our revenue declined. If we do not address these risks successfully, our business, financial condition, results of operations and prospects could be materially adversely affected, and the market price of our common stock could decline.

We have outstanding debt that could limit our ability to make expenditures and investments in the conduct of our business and adversely impact our ability to obtain future financing.

We have outstanding debt. We may be unable to generate cash sufficient to pay when due the principal of, interest on, or other amounts due in respect of our indebtedness. We may be required to dedicate significant cash flows from operations to make such payments, which could limit our ability to make other expenditures and investments in the conduct of our business. Our indebtedness may also reduce our flexibility in planning for or reacting to changes in our business and market conditions. Our indebtedness also exposes us to interest rate risk, since our debt obligations generally bear interest at variable rates. In addition, we may incur additional indebtedness in the future to meet future financing needs. If we add new debt, the risks described above could increase.

Our credit facility contains restrictive and 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, 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 the outstanding amount under the credit facility. In addition to certain financial reporting requirements, the credit facility also contains a net leverage ratio covenant that may significantly reduce our available borrowings under such facilities. As of December 31, 2020, we were in compliance with the net leverage ratio covenant. Our obligations under the credit facility are secured by substantially all of our assets, excluding intellectual property and certain investments in foreign subsidiaries. Furthermore, our future working capital, borrowings or equity financing could be unavailable to repay or refinance the amounts outstanding under the credit facility. 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 common stock would receive a portion of any liquidation proceeds only if all of our creditors, including our lenders, were first repaid in full.

Risks Related to Information Technology Systems and Data Protection

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

We are increasingly dependent upon our IT systems to conduct virtually all of our business operations, ranging from our internal operations and product development activities to our marketing and sales efforts and communications with our customers and business partners. Certain persons and entities may attempt to penetrate our network and systems, or of the systems hosting our website, and may otherwise seek to misappropriate our proprietary or confidential information or cause interruptions of our service. Because the techniques used by such persons and entities to access or sabotage networks and systems change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques. We have also outsourced a number of our business functions to third parties, including our manufacturers and logistics providers, and our business operations also depend, in part, on the success of these third parties' own cybersecurity measures. Additionally, we depend upon our employees and independent contractors to appropriately handle confidential

data and deploy our IT resources in a safe and secure fashion that does not expose our network systems to security breaches and the loss of data. Accordingly, if any of our cybersecurity systems, processes or policies, or those of any of our manufacturers, logistics providers, customers or independent contractors, fail to protect against unauthorized access, sophisticated hacking or terrorism and the mishandling, misuse, or misappropriation of data by employees, contractors or other persons or entities, our ability to conduct our business effectively could be damaged in a number of ways, including:

- sensitive data regarding our business, including intellectual property, personal information and other confidential and proprietary data, could be leaked or stolen;
- our electronic communications systems, including email and other methods, could be disrupted, and our ability to conduct our business operations could be seriously damaged until such systems can be restored;
- our ability to process customer orders and electronically deliver products and services could be degraded, and our distribution channels could be disrupted, resulting in delays in revenue recognition, damage to our relationships with customers and prospective customers and damage to our reputation;
- defects and security vulnerabilities could be introduced into our software, products, network and systems, thereby damaging our reputation and perceived reliability and security of our products and potentially making the systems of our customers vulnerable to data loss and cyber incidents; and
- personally, identifiable data relating to various parties, including end users, employees and business partners could be compromised.

Should any of the above events occur, we could be subject to significant claims for liability from our customers, employees or others and regulatory investigations or actions from governmental agencies. In addition, our ability to protect our intellectual property rights could be compromised and our reputation and competitive position could be significantly harmed. Any regulatory, contractual or other actions, litigations, investigations, fines, penalties and liabilities relating to any actual or alleged misuse or misappropriation of personal data or other confidential or proprietary information could be significant in terms of monetary exposure and reputational impact and necessitate changes to our business operations that may be disruptive to us. Additionally, we could incur significant costs in order to upgrade our cybersecurity systems, processes, policies and procedures and remediate damages. Consequently, our financial performance and results of operations could be materially adversely affected.

Risks Related to Acquisitions

We may invest in or acquire other businesses, which could require significant management attention, disrupt our business, dilute stockholder value and adversely affect our business, financial condition, results of operations and prospects.

As part of our growth strategy, we may make investments in or acquire complementary companies, products or technologies. For example, on July 1, 2019, we announced that we closed the acquisition of NetComm in Australia for cash consideration of AUD \$162.0 million (USD \$112.7 million, based on an exchange rate of USD \$0.700 per AUD \$1.00 on July 1, 2019). We do not have significant experience in making investments in other companies nor have we made a significant number of acquisitions to date, and as a result, our ability as an organization to evaluate and/or complete investments or acquire and integrate other companies, products or technologies in a successful manner is unproven. We may not be able to find suitable future investment or acquisition candidates, and we may not be able to complete such investments or acquisitions on favorable terms, if at all. Our acquisition of NetComm may not achieve the objectives we have outlined for our stockholders or strengthen our competitive position. If we complete additional investments or acquisitions, we may not ultimately strengthen our competitive position or achieve our goals, and any investments or acquisitions we complete could be viewed negatively by our customers, investors and securities analysts.

In addition, current and future investments and acquisitions may result in unforeseen operating difficulties and expenditures. For example, if we are unsuccessful at integrating any acquisitions or retaining key talent from those acquisitions, or the technologies associated with such acquisitions, into our company, the business, financial condition, results of operations and prospects of the combined company could be materially adversely affected. Any integration process may require significant time and resources, and we may not be able to manage the process successfully. We may not successfully evaluate or utilize the acquired technology or personnel or accurately forecast the financial effects of an acquisition transaction, including accounting charges. We may have to pay cash, incur debt or issue equity securities to pay for any such investment or acquisition, each of which could adversely affect our financial condition or the market price of our common stock. The sale of equity or issuance of convertible debt to finance any such acquisitions could result in dilution to our stockholders. 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. Moreover, if the investment or

acquisition becomes impaired, we may be required to take an impairment charge, which could adversely affect our financial condition or the market price of our common stock.

Risks Related to Litigation

Litigation could distract management, increase our expenses or subject us to material money damages and other remedies.

We are subject to multiple putative class action lawsuits alleging federal securities law violations in connection with our initial public offering and our subsequent follow-on offering, and may be involved from time to time in various additional legal proceedings, including, but not limited to, actions relating to breach of contract or intellectual property infringement that might necessitate changes to our business or operations. Regardless of whether any claims against us have merit, or whether we are ultimately held liable or subject to payment of damages, claims may be expensive to defend and may divert management's time away from our operations. If any legal proceedings were to result in an unfavorable outcome, it could have a material adverse effect on our business, financial position and results of operations. Any adverse publicity resulting from actual or potential litigation may also materially and adversely affect our reputation, which in turn could adversely affect our results.

Risks Related to COVID-19 Pandemic

The coronavirus outbreak could negatively impact our operations and have an adverse effect on our revenues and/or results of operations.

The emergence of the coronavirus disease, or COVID-19, in 2019 and continuance in 2020 and 2021 around the world, and particularly in the United States and China, and the accompanying responses of governments and businesses to the pandemic present various risks to us, not all of which we are able to fully evaluate or even to foresee at the current time. While the COVID-19 pandemic did not materially adversely affect our financial results, business operations or liquidity in the year ended December 31, 2020, economic and health conditions in the United States and across most of the globe changed rapidly during, and are continuing to change after the end of, the year. Globally to date, all aspects of our business remain fully operational, our work from home contingency plans have been implemented and are operating successfully, and we are working with our supply chain and contract manufacturers to ensure either continued availability of all anticipated inventory requirements or contingency plans where certain inventory requirements are delayed to try to mitigate any disruption to our delivery schedules with customers. We intend to continue to monitor our business very closely for any effects of COVID-19 for as long as necessary on an ongoing basis.

Due to the above circumstances and as described generally in this Annual Report on Form 10-K, our results of operations for the year ended December 31, 2020, are not necessarily indicative of the results to be expected in future years. Management cannot predict the full impact of the COVID-19 pandemic on our sales channels, supply chain, manufacturing and distribution, or on economic conditions generally, including the effects on our current and potential customers, who may curtail spending on investments in current and/or new technologies, delay new equipment evaluations and trials, and possibly delay payments based on liquidity concerns, all of which could have a material impact on our business in the future. Similarly, our supply chain and our contract manufacturers could be affected, which could cause disruptions to our ability to meet customer demand or delivery schedules. For the year ended December 31, 2020, we did see certain delays in the supply chain that adversely impacted a small number of delivery schedules. If COVID-19 were to continue to cause such impacts in the future, there could likely be a material adverse impact on our financial results, liquidity and capital resource needs. This uncertainty makes it challenging for management to estimate the future performance of our businesses, particularly over the near to medium term. However, the impact of COVID-19 could have a material adverse impact on our results of operations over the near to medium term.

The coronavirus outbreak has resulted in an increase in demand for certain of our solutions, which may subside or decrease when the pandemic ends.

The pandemic, and resulting lockdowns, has resulted in an increase in demand for residential broadband services, which has in turn lead to an increase in demand for certain of our solutions, including our FTTP home network connection devices and our Fixed Wireless Access CPE devices. We also saw a shift in demand from our cable customers toward more I-CCAP chassis each quarter. That increase in demand contributed to our strong revenue performance in 2020. We cannot guarantee that the heightened demand for residential broadband services will continue for the duration of the pandemic or after the pandemic ends. We similarly cannot guarantee that even to the extent the heightened demand for residential

broadband services continues that we will continue to see heightened demand for our solutions. A decrease in demand for our solutions could have a material adverse impact on our revenue and results of operations.

Risks Related to Intellectual Property

Risks Related to Our Intellectual Property

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

Our success depends, in part, on our ability to protect our proprietary technology. We rely on trade secret, patent, copyright and trademark laws and confidentiality agreements with employees and third parties to protect and enforce our rights to our proprietary technology, all of which offer only limited protection.

We have a relatively limited patent portfolio. With respect to the protection of our technology and inventions, we rely to a significant degree on trade secrets. If others independently discover our trade secrets, we would not be able to assert trade secret rights against such parties. Effective trade secret protection may not be available in every country in which our services are available or where we have employees or independent contractors. The loss or unavailability of trade secret protection could make it easier for third parties to compete with our products by copying functionality. In addition, any changes in, or unexpected interpretations of, the trade secret and employment laws in any jurisdiction in which we operate may compromise our ability to enforce our intellectual property rights. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position.

To protect our trade secrets and other proprietary information, we rely in significant part on confidentiality arrangements with our employees, licensees, independent contractors, advisers and customers. These arrangements may not be effective to prevent disclosure of proprietary information, including trade secrets, and may not provide an adequate remedy in the event of unauthorized disclosure of proprietary information.

We rely on patents to protect certain aspects of our proprietary technology in the United States and other jurisdictions. The process of obtaining patent protection is expensive and time-consuming, and we may not be able to prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. We may choose not to seek patent protection for certain innovations and may choose not to pursue patent protection in certain jurisdictions. Further, we cannot guarantee that any of our pending patent applications will result in the issuance of patents or that any patents that do issue from such applications will have adequate scope to provide us with a competitive advantage. There is no assurance that all potentially relevant prior art relating to our patents and patent applications has been found. To the extent that additional patents are issued from our patent applications, which is not certain, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed or invalidated. If third parties have prepared and filed patent applications in the United States that also claim technology to which we have rights, we may have to participate in interference proceedings in the United States Patent and Trademark Office to determine priority of invention for patent applications filed before March 16, 2013, or in derivation proceedings to determine inventorship for patent applications filed after such date. In addition, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its effective filing date. Even if patents covering our products are obtained by us or by our licensors, once such patents expire, we may be vulnerable to competition from similar products. Moreover, the rights granted under any issued patents may not provide us with adequate protection or competitive advantages, and, as with any technology, competitors may be able to develop similar or superior technologies to our own now or in the future.

Despite our efforts, the steps we have taken to protect our proprietary rights may not be adequate to preclude misappropriation of our proprietary information or infringement of our intellectual property rights, and our ability to police such misappropriation or infringement is uncertain, particularly in countries outside of the United States. Competitors may use our technologies in jurisdictions where we have not obtained or are unable to adequately enforce intellectual property protection to develop their own products. We are also restricted from asserting our intellectual property rights against certain customers under our contracts with them.

Detecting and protecting against the unauthorized use of our products, technology and proprietary rights is expensive, difficult and, in some cases, impossible. Litigation may be necessary in the future to enforce or defend our intellectual property rights, to protect our trade secrets or to determine the validity and scope of the proprietary rights of others. Such

litigation could result in substantial costs and diversion of management resources, either of which could materially adversely affect our business, financial condition, results of operations and prospects, and there is no guarantee that we would be successful. Furthermore, many of our current and potential competitors have the ability to dedicate substantially greater resources to protecting their technology or intellectual property rights than we do. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating our intellectual property, which could result in a substantial loss of our market share. Even if we did succeed in enforcing our intellectual property through litigation, this may be costly and divert management resources.

Finally, certain of our license agreements with our third-party licensors provide for joint ownership of developments or inventions that we create that are related to the subject matter of the license. Other agreements to which we are subject, including member agreements with standards bodies and research and development consortia, may require us to disclose and/or grant licenses to technology that is related to the subject matter of the standards body or the consortium and included in our contributions to specifications established by these bodies. These agreements could result in third parties having ownership or license rights to important intellectual property with respect to which we otherwise may have elected to maintain exclusive ownership.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

We have not applied for trademark registration for our name and logo in all geographic markets. In those markets where we have applied for trademark registration, failure to secure those registrations could adversely affect our ability to enforce and defend our trademark rights and result in indemnification claims. Our registered or unregistered trademarks or trade names, as well as the registered or unregistered trademarks or trade names used by our resellers or distributors associated with our products, may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. Any claim of infringement by a third party, even those claims without merit, could cause us to incur substantial costs defending against such claim, could divert management attention from our business and could require us to cease use of such intellectual property in certain geographic markets. Over the long term, if we, or our resellers or distributors, are unable to establish name recognition based on our trademarks and trade names, then our business may be adversely affected.

Risks Related to Third-Party Intellectual Property.

Unavailability, termination or breach of licenses to third-party software and other intellectual property could materially harm our business.

Many of our products and services include software or other intellectual property licensed from third parties, and we otherwise use software and other intellectual property licensed from third parties in our business. We exercise no control over our third-party licensors, and the failure or unsuitability of their software or other intellectual property exposes us to risks that we will have little ability to control. For example, a licensor may have difficulties keeping up with technological changes or may stop supporting the software or other intellectual property that it licenses to us; our licensors may also have the ability to terminate our licenses if the licensed technology becomes the subject of a claim of intellectual property infringement. Also, it will be necessary in the future to renew licenses, expand the scope of existing licenses or seek new licenses, relating to various aspects of these products and services or otherwise relating to our business, which may result in increased license fees. Any new licenses may not be available on acceptable terms, if at all. In addition, a third party may assert that we or our customers are in breach of the terms of a license, which could, among other things, give such third party the right to terminate a license or seek damages from us, or both. The inability to obtain or maintain certain licenses or other rights or to obtain or maintain such licenses or rights on favorable terms, or the need to engage in litigation regarding these matters, could result in delays in releases of products and services and could otherwise disrupt our business, until equivalent technology can be identified, licensed or developed, if at all, and integrated into our products and services or otherwise in the conduct of our business. Moreover, the inclusion in our products and services of software or other intellectual property licensed from third parties on a nonexclusive basis may limit our ability to differentiate our products from those of our competitors. Any of these events could have a material adverse effect on our business, financial condition, results of operations and prospects.

Our products contain third-party open source software components, and failure to comply with the terms of the underlying open source software licenses could restrict our ability to sell our products.

Our products contain software modules licensed to us by third parties under “open source” licenses. 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 code. Some open source licenses contain requirements that we make available source code for modifications or derivative works we create based upon the type of open source software that we use. If we combine our software with open source software in a certain manner, we could, under certain open source licenses, be required to release portions of the source code of our software to the public. This would allow our competitors to create similar products with lower development effort and time and ultimately could result in a loss of product sales for us.

Although we monitor our use of open source software to avoid subjecting our products to undesirable conditions, we do not have a formal open source policy in place that gives our developers written guidance on what open source licenses we deem “safe.” Further, even where we believe an open source license may have acceptable conditions, the terms of many open source licenses have not been interpreted by U.S. courts, and these licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our products. Moreover, we cannot guarantee that our informal processes for controlling our use of open source software in our products will be effective or that our compliance with open source licenses, including notice and attribution requirements, are adequate. If we are held to have breached the terms of an open source software license, we could be required to seek licenses, which may not be available on economically feasible terms, from third parties to continue offering our products, to re-engineer our products, to discontinue the sale of our products if re-engineering could not be accomplished on a timely or commercially reasonable basis, or to make generally available, in source code form, our proprietary code. We also could face infringement claims. Any of the foregoing could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Intellectual Property Litigation

Assertions by third parties of infringement or other violations by us of their intellectual property rights, or other lawsuits asserted against us, could result in significant costs and materially adversely affect our business, financial condition, results of operations and prospects.

Patent and other intellectual property disputes are common in the broadband industry and have resulted in protracted and expensive litigation for many companies. Many companies in the broadband infrastructure industry, including our competitors and other third parties, as well as non-practicing entities, own large numbers of patents, copyrights, trademarks and trade secrets, which they may use to assert claims of patent infringement, misappropriation or other violations of intellectual property rights against us. As discussed in greater detail below, from time to time, they have or may in the future also assert such claims against our customers or certain of our business partners whom we typically indemnify against claims that our products infringe, misappropriate or otherwise violate the intellectual property rights of third parties.

As the number of products and competitors in our market increases and overlaps occur, claims of infringement, misappropriation and other violations of intellectual property rights may increase. Any claim of infringement, misappropriation or other violations of intellectual property rights by a third party, even those without merit, could cause us to incur substantial costs defending against the claim, distract our management from our business and require us to cease use of such intellectual property, which may impact important elements of our business. In addition, some claims for patent infringement may relate to subcomponents that we purchase from third parties. If these third parties are unable or unwilling to indemnify us for these claims, we could be substantially harmed.

The patent portfolios of most of our competitors are larger than ours. This disparity may increase the risk that our competitors may sue us for patent infringement and may limit our ability to counterclaim for patent infringement or settle through patent cross-licenses. In addition, future assertions of patent rights by third parties, and any resulting litigation, may involve patent holding companies or other adverse patent owners who have no relevant product revenue and against whom our own patents may therefore provide little or no deterrence or protection. We cannot guarantee that we are not infringing or otherwise violating any third-party intellectual property rights.

The third-party asserters of intellectual property claims may be unreasonable in their demands, or may simply refuse to settle, which could lead to expensive settlement payments, prolonged periods of litigation and related expenses, additional burdens on employees or other resources, distraction from our business, supply stoppages and lost sales. Moreover, in recent years, individuals and groups that are non-practicing entities, commonly referred to as “patent trolls,” have purchased patents and other intellectual property assets for the purpose of making claims of infringement in order to extract settlements. From time to time, we receive threatening letters or notices and have been the subject of claims that our solutions and underlying technology infringe or violate the intellectual property rights of others. Responding to such claims, regardless of their merit, can be time-consuming, costly to defend in litigation, divert management’s attention and resources, damage our reputation and brand, and cause us to incur significant expenses.

An adverse outcome of a dispute may require us to pay substantial damages including treble damages if we are found to have willfully infringed a third party's patents; cease making, licensing or using solutions that are alleged to infringe or misappropriate the intellectual property of others; expend additional development resources to attempt to redesign our products or services or otherwise to develop non-infringing technology, which may not be successful; enter into potentially unfavorable royalty or license agreements in order to obtain the right to use necessary technologies or intellectual property rights; and indemnify our partners and other third parties. Any damages or royalty obligations we may become subject to as a result of an adverse outcome, and any third-party indemnity we may need to provide, could materially adversely affect our business, financial condition, results of operations and prospects. Royalty or licensing agreements, if required or desirable, may be unavailable on terms acceptable to us, or at all, and may require significant royalty payments and other expenditures. Further, there is little or no information publicly available concerning market or fair values for license fees, which can lead to overpayment of license or settlement fees. In addition, some licenses may be non-exclusive, and therefore our competitors may have access to the same technology licensed to us. Suppliers subject to third-party intellectual property claims also may choose or be forced to discontinue or alter their arrangements with us, with little or no advance notice to us. Any of these events could materially adversely affect our business, financial condition, results of operations and prospects.

Our indemnification obligations to our customers and business partners for claims of intellectual property infringement or misappropriation are relatively broad in scope and could result in significant liability for us.

Our agreements with our customers and certain of our business partners typically include broad intellectual property indemnification provisions pursuant to which we may be required to indemnify and hold harmless our customers and partners for all damages, costs, expenses, liabilities, and settlements (including court costs and attorney fees) arising out of any claim, cause of action, demand, lawsuit or other action alleging that the customer or partner's use, operation or resale of our products infringes a third party's intellectual property rights or misappropriates a third party's trade secrets. We do not necessarily have the right to assume the defense of such claims in all instances, and in some cases, we may have such right, but we may decline to take advantage of it. To the extent they control the defense of any such claim, our customers and partners may select legal counsel, agree to legal fee arrangements, or pursue legal strategies that we would not select. In some instances, our customers or partners may be able to settle claims without our consent despite our obligation to contribute in part or in full to any settlement. The resolution of any such claim may require us to procure for our customers or partners the right to continue using the solution in controversy or modifying the solution so that it becomes non-infringing or no longer constitutes a misappropriation. If neither of those options is feasible, we could be required in some instances to refund, in full or in part, the license fee or the purchase price paid in connection with the solution in controversy. For all of these reasons, our potential liability with respect to any demand for indemnification, even if the claim of infringement or misappropriation ultimately fails, could be substantial and could materially adversely affect our business, financial condition, results of operations and prospects.

Plaintiffs bringing intellectual property infringement and misappropriation claims often will target defendants perceived to have the deepest pockets. Our customers and certain of our business partners are often significantly larger than we are. As a result, plaintiffs may target our customers and business partners (as opposed to targeting us) for claims alleging infringement or misappropriation by our solutions. We have in the past, and expect that we will continue in the future, to receive demands for intellectual property indemnification from our customers and partners. While the liability we have incurred to date has not been material in any single case or in the aggregate, we cannot guarantee that that in the future we will not incur a material liability under our indemnification obligations. Such a liability, were it to occur, could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Our Common Stock

Risks Related to Investment in Our Common Stock

Our results of operations are likely to vary significantly from period to period and be unpredictable. If we fail to meet the expectations of analysts or investors, the market price of our common stock could decline substantially.

Our results of operations have historically varied significantly from period to period, and we expect that this trend will continue. As a result, you should not rely upon our past financial results for any period as indicators of future performance. Our results of operations in any given period can be influenced by a number of factors, many of which are outside of our control and may be difficult to predict, including the factors described above, as well as:

- changes in our pricing, whether initiated by us or as a result of competition;

- changes in our product mix, which may vary from period to period and negatively affect our gross margin and overall profitability;
- the amount and timing of operating costs and capital expenditures related to the operation and expansion of our business;
- changes in the growth rate of the broadband services market or changes in demand for broadband services from our customers' subscribers, which could impact the level of demand for our products;
- lengthy product testing or certification processes by our customers of our products, which could significantly delay our ability to recognize revenue;
- the actual or rumored timing and success of new product and service introductions by us or our competitors or any other change in the competitive landscape of our industry, including consolidation among our competitors or customers;
- our ability to successfully expand our business geographically;
- insolvency or credit difficulties confronting our customers, which could adversely affect their ability to purchase or pay for our products and services, or confronting our key suppliers, including our sole source suppliers, which could disrupt our supply chain;
- our inability to fulfill our customers' orders due to supply chain delays, access to key commodities or technologies or events that impact our manufacturers or their suppliers;
- the cost and possible outcomes of any legal actions or proceedings against us, including those described under "Part I, Item 3 – Legal Proceedings";
- our overall effective tax rate, including impacts caused by any changes in the valuation of our deferred tax assets and any new legislation or regulatory developments;
- increases or decreases in our expenses caused by fluctuations in foreign currency exchange rates; and
- general economic conditions, both domestically and in foreign markets.

Any one of the factors above or the cumulative effect of several of the factors described above may result in significant fluctuations in our financial and other results of operations. This variability and unpredictability could result in our failure to meet expectations of securities analysts or investors for a particular period. If we fail to meet or exceed such expectations for these or any other reasons, the market price of our common stock could decline substantially, and we could face costly lawsuits, including securities class action suits, such as those described in "Part I, Item 3 – Legal Proceedings."

The market price of our common stock has been volatile in the past and may be volatile in the future, which could result in substantial losses for investors.

The market price of our common stock has endured significant and swift increases and declines in the time since trading in the stock on the Nasdaq Global Select Market began on December 15, 2017. The market price of our common stock could be subject to similar significant fluctuations in the future. Some of the factors that may cause the market price of our common stock to fluctuate include:

- actual or anticipated changes in our earnings or fluctuations in our results of operations or in the expectations of securities analysts;
- price and volume fluctuations in the overall stock market from time to time;
- volatility in the market price and trading volume of comparable companies;
- announcements of technological innovations, new products, strategic alliances, or significant agreements by us or by competitive vendors;
- announcements by our customers regarding significant increases or decreases in capital expenditures;
- departure of key personnel;
- litigation involving us or that may be perceived as having an impact on our business;
- changes in general economic, industry and market conditions and trends;
- investors' general perception of us;

- the cost and possible outcomes of any legal actions or proceedings against us, including those described under “Part I, Item 3 – Legal Proceedings”;
- sales of large blocks of our stock; and
- announcements regarding further industry consolidation.

As described in “Part I, Item 3 – Legal Proceedings,” we and certain of our current and former executive officers and current and former members of our board of directors have been named as defendants in several putative class action lawsuits relating to past decreases in the market price of our common stock. Because of the potential volatility of our stock price, we may become the target of additional securities litigation in the future. Securities litigation could result in substantial costs and divert management’s attention and resources from our business.

We have broad discretion in the use of our cash reserves and may not use them effectively.

Subject to restrictions in the agreements governing our indebtedness, our management has broad discretion to use our cash reserves and could use our cash reserves in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could adversely affect our ability to operate and grow our business. Pending their use, we may invest our cash reserves in a manner that does not produce income or that loses value.

Because we do not expect to declare any dividends on our common stock for the foreseeable future, investors in our common stock may never receive a return on their investment.

Although we declared special dividends on five occasions prior to our initial public offering, we do not anticipate that we will declare any cash dividends to holders of our common stock in the foreseeable future, and investors should not rely on an investment in our common stock to provide dividend income. Instead, we plan to retain any earnings to maintain and expand our existing operations. Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any return on their investment. As a result, investors seeking cash dividends should not purchase our common stock.

Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on a number of factors, including future earnings, capital requirements, financial conditions, future prospects, contractual restrictions and covenants, and other factors that our board of directors may deem relevant. Our credit facility contains covenants that limit our ability to pay dividends on our capital stock.

Insiders have substantial control over us, which could limit your ability to influence the outcome of key transactions, including a change of control.

As of January 29, 2021, our directors, executive officers and 10% stockholders beneficially owned, in the aggregate, approximately 63.5% of our outstanding common stock. As a result, these stockholders could have significant influence over the outcome of matters submitted to our stockholders for approval, including the election of directors and any merger, consolidation or sale of all or substantially all of our assets, and over the management and affairs of our company. This concentration of ownership may have the effect of delaying or preventing a change in control of our company and might affect the market price of our common stock.

A significant portion of our total outstanding shares may be sold into the public market at any time, which could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a significant number of shares of our common stock in the public market could occur at any time. These sales, or the market perception that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock.

In addition to our outstanding common stock, as of January 29, 2021, there were 7,049,728 shares subject to outstanding options, 4,007,131 shares subject to outstanding restricted stock unit awards, or RSUs, 737,314 shares subject to outstanding performance-based restricted stock units, or PSUs, and an additional 10,845,634 shares reserved for future issuance under our equity incentive plans. Because we have registered most shares of common stock that may be issued under our equity incentive plans pursuant to a Registration Statement on Form S-8, any such registered shares that we issue can be freely sold in the public market upon issuance, subject to the restrictions imposed on our affiliates under Rule 144.

Moreover, holders of an aggregate of approximately 53,365,219 shares of our common stock as of January 29, 2021, have rights, subject to certain conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. Upon registration, such shares would be able to be freely sold in the public market.

Our management team has limited experience managing a public company.

Most members of our management team have limited experience managing a publicly traded company, interacting with public company investors and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage our operations as a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the scrutiny of securities analysts and investors. These new obligations and constituents will require significant attention from our management team and could divert their attention away from the day-to-day management of our business, which could materially adversely affect our business, financial condition, results of operations and prospects.

Risks Related to Our Charter and Bylaws

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

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

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

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

Our restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders. Our restated certificate of incorporation further provides that the federal district courts of the United States are the sole and exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. These choice of forum provisions could limit our stockholders' ability to obtain a more favorable judicial forum for disputes with us or our directors, officers or employees.

Our restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our certificate of incorporation

or our bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. We do not intend to have this choice of forum provision apply to, and this choice of forum provision will not apply to, actions arising under the Securities Exchange Act of 1934, as amended, or the Exchange Act.

Our restated certificate of incorporation further provides that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States shall, to the fullest extent permitted by law, be the sole and exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act of 1933, as amended, or the Securities Act. On December 19, 2018, the Delaware Court of Chancery, in *Sciabacucchi v. Salzberg, et al.*, Civil Action No. 2017-0931-JTL (Del. Ch. Dec. 19, 2018), held that such federal forum selection provisions are invalid under Delaware law. Upon appeal, on March 18, 2020, the Delaware Supreme Court reversed the Court of Chancery's judgment in all respects, upholding the facial validity of such federal forum selection provisions.

These choice of forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provisions contained in our certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could materially adversely affect our business, financial condition, results of operations and prospects.

General Risk Factors

The requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain qualified board members.

As a public company, we are subject to the reporting requirements of the Exchange Act, the listing requirements of the Nasdaq Stock Market and other applicable securities rules and regulations. Compliance with these rules and regulations have increased our legal and financial compliance costs, made some activities more difficult, time-consuming or costly, and increased demand on our systems and resources, and will continue to do so, particularly after we are no longer an emerging growth company. Among other things, the Exchange Act requires that we file annual, quarterly and current reports with respect to our business and results of operations and maintain effective disclosure controls and procedures and internal control over financial reporting. We will continue to require significant resources and management oversight in order to maintain and, if required, improve our disclosure controls and procedures and internal control over financial reporting to meet this standard. As a result, management's attention may be diverted from other business concerns, which could harm our business and results of operations. Although we have already hired additional employees to comply with these requirements, we may need to hire even more employees in the future, which will increase our costs and expenses. We are required to conduct annual evaluations of the effectiveness of our internal control over financial reporting, including to identify and remediate any deficiencies in those internal controls. We may not be able to complete our evaluation, testing and any required remediation in a timely fashion. During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting that we are unable to remediate before the end of the same fiscal year in which the material weakness is identified, we will be unable to assert that our internal controls are effective. If we are unable to assert that our internal control over financial reporting is effective in any future reporting period, or if our auditors are unable to attest to management's report on the effectiveness of our internal controls, which will be required after we are no longer an emerging growth company, we could lose investor confidence in the accuracy and completeness of our financial reports, which would cause the price of our common stock to decline.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are increasing legal and financial compliance costs and making some activities more time-consuming. We have invested and will continue to invest resources to comply with evolving laws, regulations and standards, and this investment has resulted and may continue to result in increased selling, general and administrative expense and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

As a result of being a public company, it is more expensive for us to obtain director and officer liability insurance, and in the future we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage. These factors could also make it more difficult for us to attract and retain qualified members of our board of directors and qualified executive officers.

We are exposed to fluctuations in currency exchange rates, which could adversely affect our business, financial condition, results of operations and prospects.

Our sales agreements are primarily denominated in U.S. dollars. Therefore, a strengthening U.S. dollar could increase the real cost of our products to our customers outside of the U.S., and alternatively a decrease in the value of the U.S. dollar relative to foreign currencies could increase our product and operating costs in foreign locations. If we are not able to successfully hedge against the risks associated with the currency fluctuations, our business, financial condition, results of operations and prospects could be materially adversely affected.

Failure to comply with governmental laws and regulations could materially adversely affect our business, financial condition, results of operations and prospects.

Our business is subject to regulation by various federal, state, local and foreign governmental agencies, including agencies responsible for monitoring and enforcing employment and labor laws, workplace safety, product safety, environmental laws, consumer protection laws, anti-bribery laws, import/export controls, foreign investment, federal securities laws and tax laws and regulations. In certain jurisdictions, these regulatory requirements may be more stringent than those in the United States. From time to time, we may receive inquiries from such governmental agencies or we may make voluntary disclosures regarding our compliance with applicable governmental regulations or requirements. Noncompliance with applicable government regulations or requirements could subject us to sanctions, mandatory product recalls, enforcement actions, disgorgement of profits, fines, damages, civil and criminal penalties or injunctions. If any governmental sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, financial condition, results of operations and prospects could be materially adversely affected. In addition, responding to any action will likely result in a significant diversion of management's attention and resources and an increase in professional fees. Enforcement actions and sanctions could materially adversely affect our business, financial condition, results of operations and prospects.

We are subject to anti-corruption laws such as the FCPA.

We are subject to anti-corruption laws such as the FCPA, which generally prohibits U.S. companies and their employees and intermediaries from making corrupt payments to foreign officials for the purpose of obtaining or keeping business, securing an advantage or directing business to another individual or entity, and requires companies to maintain accurate books and records. Under the FCPA, U.S. companies may be held liable for the corrupt actions taken by directors, officers, employees, agents, or other strategic or local partners or representatives. We rely on non-employee third-party representatives and other intermediaries to develop international sales opportunities, and generally have less direct control over such third parties' actions taken on our behalf. If we or our intermediaries fail to comply with the requirements of the FCPA or similar legislation, governmental authorities in the United States and elsewhere could seek to impose civil and/or criminal fines and penalties, which could have a material adverse effect on our business, reputation, results of operations and financial condition. We intend to increase our international sales and business and, as such, the cost of complying with such laws, and the potential harm from our noncompliance, are likely to increase.

Failure to comply with anti-corruption laws, such as the FCPA and the United Kingdom Bribery Act 2010, or the Bribery Act, and similar laws associated with our activities outside the United States, could subject us to penalties and other adverse consequences. Any violation of the FCPA, Bribery Act or similar laws could result in whistleblower complaints, adverse media coverage, investigations, loss of export privileges, severe criminal or civil sanctions suspension, or debarment from U.S. government contracts, all of which could have a material adverse effect on our reputation, business, results of operations and prospects. In addition, responding to any enforcement action or related investigation may result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees.

Our failure to adequately protect personal data and to comply with related laws and regulations could result in material liability.

A wide variety of provincial, state, national, foreign, and international laws and regulations apply to the collection, use, retention, protection, disclosure, transfer (including across national boundaries), and other processing of personal data. These data protection and privacy-related laws and regulations are evolving and being tested in courts and may result in ever-increasing regulatory and public scrutiny and escalating levels of enforcement and sanctions.

Any failure by us to comply with applicable data privacy laws and regulations, or to protect such data, could result in enforcement action against us, including fines, imprisonment of company officials, public censure, claims for damages by end customers and other affected persons and entities, damage to our reputation and loss of goodwill, and other forms of injunctive or operations-limiting relief, any of which could have a material adverse effect on our operations, financial performance, and business.

Definitions of personal data and personal information, and requirements relating to the same under applicable laws and regulations within the European Union, the United States, Australia, and elsewhere, change frequently and are subject to new and different interpretations by courts and regulators. Because the interpretation and application of laws and other obligations relating to privacy and data protection are uncertain, it is possible that existing or future laws, regulations, and other obligations may be interpreted and applied in a manner that is inconsistent with our data management practices. We may be required to expend significant resources to modify our products and otherwise adapt to these changes, which we may be unable to do on commercially reasonable terms or at all, and our ability to develop new products and features could be limited. These developments could harm our business, financial condition and results of operations. Even if not subject to legal challenge, the perception of privacy concerns, whether or not valid, may harm our reputation and inhibit adoption of our products by current and prospective customers.

Our international operations may give rise to potentially adverse tax consequences.

We are expanding our international operations and staff to better support our growth into international markets. We generally conduct our international operations through wholly owned subsidiaries and report our taxable income in various jurisdictions worldwide based upon our business operations in those jurisdictions. Our corporate structure and associated transfer pricing policies contemplate the business flows and future growth into the international markets, and consider the functions, risks and assets of the various entities involved in the intercompany transactions. The amount of taxes we pay in different jurisdictions will depend to a significant degree on the application of the tax laws of the various jurisdictions to our international business activities, changes in tax rates, new or revised tax laws or interpretations of existing tax laws and policies and our ability to operate our business in a manner consistent with our corporate structure and intercompany arrangements, any or all of which could result in additional tax liabilities or increases in, or in the volatility of, our effective tax rate.

The taxing authorities of the jurisdictions in which we operate may challenge our methodologies for pricing intercompany transactions, which are required to be computed on an arm's-length basis pursuant to the intercompany arrangements or disagree with our determinations as to the income and expenses attributable to specific jurisdictions. If such a challenge or disagreement were to occur, and our position was not sustained, we could be required to pay additional taxes, interest and penalties, which could result in one-time tax charges, higher effective tax rates, reduced cash flows and lower overall profitability of our operations; in addition, it is uncertain whether any such adverse effects could be mitigated by corresponding adjustments in other jurisdictions with respect to the items affected. Our financial statements could fail to reflect adequate reserves to cover such a contingency.

Further changes in the tax laws of foreign jurisdictions could arise, including as a result of the base erosion and profit shifting project undertaken by the Organization for Economic Co-operation and Development, or the OECD. The OECD, which represents a coalition of member countries, has issued recommendations that, in some cases, make substantial changes to numerous long-standing tax positions and principles; many of these changes have been adopted or are under active consideration by OECD members and/or other countries.

Portions of our operations are subject to a reduced tax rate under various tax holidays and rulings. We also utilize tax rulings and other agreements to obtain certainty in treatment of certain tax matters. These tax holidays and rulings expire in whole or in part from time to time and may be extended when certain conditions are met or terminated if certain conditions are not met. The impact of any changes in conditions would be the loss of certainty in treatment thus potentially impacting our effective income tax rate.

Recent changes to the U.S. tax laws impact the tax treatment of foreign earnings by, among other things, creating limits on the ability of taxpayers to claim and utilize foreign tax credits, imposing minimum effective rates of current tax on certain classes of foreign income, and imposing additional taxes in connection with specified payments to related foreign recipients, among other items. While some of these changes may be adverse on a going forward basis, others may provide benefits that may be applicable to us. Due to our existing international business activities, which we anticipate expanding, any additional guidance such as U.S. Treasury regulations and administrative interpretations may increase our worldwide effective tax rate and adversely affect our financial condition and operating results.

We are also subject to the examination of our tax returns by the U.S. Internal Revenue Service, or IRS, and other tax authorities. The final determination of tax audits and any related disputes could be materially different from our historical income tax provisions and accruals and could have an adverse effect on our financial statements for the period or periods for which the applicable final determinations are made.

Taxing authorities may successfully assert that we should have collected or in the future should collect sales and use, value added or similar taxes, and we could be subject to liability with respect to past or future sales, which could adversely affect our operating results.

We do not collect sales and use, value added or similar taxes in all jurisdictions in which we have sales, and we have been advised that such taxes are not applicable to our products and services in certain jurisdictions. Sales and use, value added, and similar tax laws and rates vary greatly by jurisdiction. Certain jurisdictions in which we do not collect such taxes may assert that such taxes are applicable, which could result in tax assessments, penalties and interest, to us or our end-customers for the past amounts, and we may be required to collect such taxes in the future. If we are unsuccessful in collecting such taxes from our end-customers, we could be held liable for such costs. Such tax assessments, penalties and interest, or future requirements may adversely affect our operating results.

If we needed to raise additional capital to expand our operations and invest in new products, our failure to do so on favorable terms could reduce our ability to compete and could materially adversely affect our business, financial condition, results of operations and prospects.

We expect that our existing cash and cash equivalents will be sufficient to meet our anticipated cash needs for at least the next 12 months. However, if we need to raise additional funds to expand our operations and invest in new products, we may not be able to obtain additional debt or equity financing on favorable terms, if at all. If we raise additional equity financing, our stockholders may experience significant dilution of their ownership interests, and the market price of our common stock could decline.

Our business is subject to the risks of fire, power outages, floods and other catastrophic events and to interruption by manmade problems such as terrorism.

Our corporate headquarters and the operations of our key manufacturing vendors, as well as many of our customers, are located in areas exposed to risks of natural disasters such as fires and floods. A significant natural disaster, such as a fire, flood or other catastrophic events such as a disease outbreak, could have a material adverse effect on our or their business, which could in turn materially adversely affect our business, financial condition, results of operations and prospects. For example, as a result of travel restrictions due to the recent outbreak of a novel strain of coronavirus originating in Wuhan, China, certain of our inventory shipments from China may be delayed. In the event our manufacturing or logistics abilities are hindered by any of the events discussed above, shipments could be delayed, which could result in missed financial targets, such as revenue and shipment targets, for a particular quarter. Further, if a natural disaster occurs in a region from which we derive a significant portion of our revenue, customers in that region may delay or forego purchases of our products, which could materially adversely affect our business, financial condition, results of operations and prospects. In addition, acts of terrorism could cause disruptions in our business or the business of our manufacturers, logistics providers, partners or customers or the economy as a whole. All of the aforementioned risks may be compounded if our disaster recovery plans and those of our manufacturers, logistics providers or partners prove to be inadequate. To the extent that any of the above results in delays or cancellations of customer orders, or delays in the manufacture, deployment or shipment of our products, our business, financial condition, results of operations and prospects would be adversely affected.

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 timing for this phase-out, as well the impact of a replacement reference rate for our outstanding term loan, are 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, derivatives, 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. Additionally, the elimination of LIBOR may adversely impact the value of and the expected return on our existing derivatives, if any. At this time, no final 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.

If securities or industry analysts cease publishing research or reports about us, our business or our market, or if they publish negative evaluations of our stock or the stock of other companies in our industry, the price of our stock and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts may publish about us, our business, our market or our competitors. If one or more of the industry analysts covering our business downgrade their evaluations of our stock or the stock of other companies in our industry, the price of our stock could decline. If one or more of these analysts cease to cover our stock, we could lose visibility in the market for our stock, which in turn could cause our stock price to decline.

We are an “emerging growth company,” and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an “emerging growth company,” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and may remain an emerging growth company until the last day of our fiscal year following the fifth anniversary of our initial public offering, subject to specified conditions. For so long as we remain an emerging growth company, we are permitted, and intend, to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include being permitted to provide reduced disclosure regarding executive compensation and exemptions from the requirements to hold non-binding advisory votes on executive compensation and golden parachute payments, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002 related to our internal control over financial reporting, and not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding a supplement to the auditor’s report providing additional information about the audit and the financial statements. We cannot predict whether investors will find our common stock less attractive if we rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Further, Section 102(b)(1) of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies (that is, companies that have not filed a pending registration statement under the Securities Act, had a Securities Act registration statement declared effective or do not have a class of securities registered under the Exchange Act) are required to comply with the new or revised financial accounting standards. The JOBS Act provides that a company can elect to opt out of the extended transition period and comply with the requirements that apply to non-emerging growth companies, but any such election to opt out is irrevocable. We have elected not to opt out of such extended transition period, which means that when a standard is issued or revised, and it has different application dates for public or private companies, we will adopt the new or revised standard at the time private companies adopt the new or revised standard, provided that we continue to be an emerging growth company. This may make comparison of our financial statements with the financial statements of another public company that is not an emerging growth company, or an emerging growth company that has opted out of using the extended transition period, difficult or impossible because of the potential differences in accounting standards used.

We will remain an emerging growth company until the last day of the fiscal year following the fifth anniversary of our initial public offering, which is December 31, 2022, or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company if we have more than \$1.07 billion in annual revenue, we have more than \$700 million in market value of our stock held by non-affiliates, or we issue more than \$1 billion of non-convertible debt securities over a three-year period.

We are subject to U.S. foreign investment regulations which may impose additional burdens on or may limit certain investors’ ability to purchase our common stock, potentially making our common stock less attractive to investors.

In October 2018, the U.S. Department of Treasury announced a pilot program to implement part of the Foreign Investment Risk Review Modernization Act, or FIRRMA, effective November 10, 2018. The pilot program expands the jurisdiction of the Committee on Foreign Investment in the United States, or CFIUS, to include certain direct or indirect foreign investments in a defined category of U.S. companies, including companies involved in manufacturing communications equipment. Among other things, FIRRMA empowers CFIUS to require certain foreign investors to make mandatory filings and permits CFIUS to charge filing fees related to such filings. Such filings are subject to review by CFIUS. Any such restrictions on the ability to purchase shares of our common stock that have the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock and could also affect the price that some investors are willing to pay for our common stock.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Facilities

Our corporate headquarters is located in Andover, Massachusetts and consists of approximately 122,000 square feet of space. We own the property constituting our corporate headquarters, and prior to July 1, 2020, we were subject to an \$8.0 million mortgage loan. The annual interest rate on the loan was 3.5%, and the loan was repayable in 60 monthly installments of principal and interest based on a 20-year amortization schedule. The remaining amount of unpaid principal under the loan of \$6.5 million was paid on its maturity date of July 1, 2020. The loan terms included annual affirmative, negative and financial covenants, including a requirement that we maintain a minimum debt service ratio. We were in compliance with all annual covenants of the mortgage loan as of the last measurement date of December 31, 2019.

We lease additional facilities in Lawrence, Massachusetts and Limerick, Ireland that we use for manufacturing, testing, logistics, and customer support, facilities in Guangzhou, China, that we use for manufacturing, testing, logistics, research and development and technical support, facilities in Sydney and Melbourne, Australia that we use for logistics, customer support and research and development and facilities in Valencia, Spain, Pak Shek Kok, Hong Kong, and Shenzhen and Hefei, China that we use primarily for research and development.

We believe that our current facilities are adequate to meet our current needs. We anticipate expanding our facilities as we add employees and enter new geographic markets. We believe that suitable additional or alternative space will be available on acceptable terms as needed to accommodate future growth.

Item 3. Legal Proceedings.

From time to time, we are a party to various litigation matters and subject to claims that arise in the ordinary course of business including, for example, patent infringement lawsuits by non-practicing entities. In addition, third parties may from time to time assert claims against us in the form of letters and other communications.

On May 29, 2019, John Shen filed a putative shareholder class action complaint in the Massachusetts Superior Court of Essex County, *John Shen v. Casa Systems, Inc., et al., Civil Action No. 1977CV00787*, against us; certain of our current and former executive officers and directors; Summit Partners, our largest investor; and the underwriters from our December 15, 2017, initial public offering, or IPO. On July 3, 2019, Mirza R. Baig filed a similar putative shareholder class action complaint in the Massachusetts Superior Court of Essex County, *Mirza R. Baig v. Casa Systems, Inc., Civil Action No. 1977CV00961*, against the same defendants. Pursuant to plaintiffs' motion filed on July 26, 2019, and accepted September 3, 2019, the two matters were consolidated and transferred to the Business Litigation Session of the Massachusetts Superior Court, Suffolk County, *John Shen v. Casa Systems, Inc., et al., Civil Action No. 19-CV-03203-BLS2* and *Mirza R. Baig v. Casa Systems, Inc., Civil Action No. 19-CV-03204-BLS2*. The complaints purported to be brought on behalf of all purchasers of our common stock in and/or traceable to the IPO. The complaints generally alleged that (i) each of the defendants violated Section 11 and/or Section 12(a)(2) of the Securities Act of 1933, as amended, or the Securities Act, because documents related to the IPO, including our registration statement and prospectus were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to make such statements not misleading and (ii) the individual defendants and Summit Partners acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 12, 2019, the plaintiffs filed an amended shareholder class action complaint, purportedly on behalf of all purchasers of our common stock in and/or traceable to the IPO, which contained substantially similar allegations and asserted the same claims as the two initial complaints, described above. Plaintiffs sought, among other things compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, and equitable and injunctive relief. On January 14, 2020, the defendants filed motions to dismiss the amended complaint with prejudice. On January 11, 2021, the court granted the motions to dismiss.

On August 9, 2019, Donald Hook filed a putative shareholder class action lawsuit in the Supreme Court of the State of New York, County of New York, *Donald Hook, et al., v. Casa Systems, Inc. et al., Index No. 654548/2019*, against the same defendants named in the Shen and Baig matters. The complaint purports to be brought on behalf of all purchasers of our common stock in and/or traceable to our IPO and generally alleges that (i) each of the defendants violated Section 11 and/or Section 12(a)(2) of the Securities Act because documents related to our IPO including our registration statement and prospectus were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to make such statements not misleading and (ii) the individual defendants and Summit Partners acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 22, 2019, the plaintiff filed an

amended complaint, which contains substantially similar allegations as the initial complaint, described above, and asserts claims for violations of Sections 11 and 15 of the Securities Act. Plaintiff seeks, among other things, compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, disgorgement, and equitable and injunctive relief. On January 21, 2020, the defendants filed motions to dismiss the amended complaint, which remains pending.

On August 13, 2019, Panther Partners, Inc. filed a putative shareholder class action lawsuit in the Supreme Court of the State of New York, New York County, *Panther Partners, Inc., et al., v. Jerry Guo et al., Index No 654585/2019*, against us, certain of our current and former executive officers and directors, and the underwriters from our April 30, 2018 follow-on offering of common stock, which we refer to as our “Follow-on Offering.” The complaint purports to be brought on behalf of all purchasers of our common stock in our Follow-on Offering and generally alleges that (i) each of the defendants, other than Abraham Pucheril, violated Section 11 of the Securities Act, and each of the defendants violated Section 12(a)(2) of the Securities Act, because documents related to our Follow-on Offering, including our registration statement and prospectus, were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to make such statements not misleading and (ii) the individual defendants acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 22, 2019, the plaintiff filed an amended complaint, which contains substantially similar allegations and asserts the same claims as the initial complaint, described above. Plaintiff seeks, among other things, compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, and equitable and injunctive relief. On January 21, 2020, the defendants served motions to dismiss the amended complaint, which remain pending.

We are generally obligated to indemnify our officers, directors, and the IPO and Follow-on Offering underwriters in each of the matters described above.

No amounts have been accrued for any of the putative class action lawsuits referenced above in the year ended December 31, 2020, as we do not believe the likelihood of a material loss is probable. Although the ultimate outcome of these matters cannot be predicted with certainty, the resolution of any of these matters could have a material impact on our results of operations in the period in which such matter is resolved.

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 common stock trades on the Nasdaq Global Select Market under the symbol “CASA”. Trading of our common stock on the Nasdaq Global Select Market commenced on December 15, 2017 in connection with our initial public offering, or IPO. Prior to that time, there was no established public trading market for our common stock.

Holders of Record

As of January 29, 2021, there were 15 holders of record of our common stock. Because many of our shares are held by brokers and other institutions on behalf of stockholders, we are not able to estimate the number of stockholders represented by these record holders.

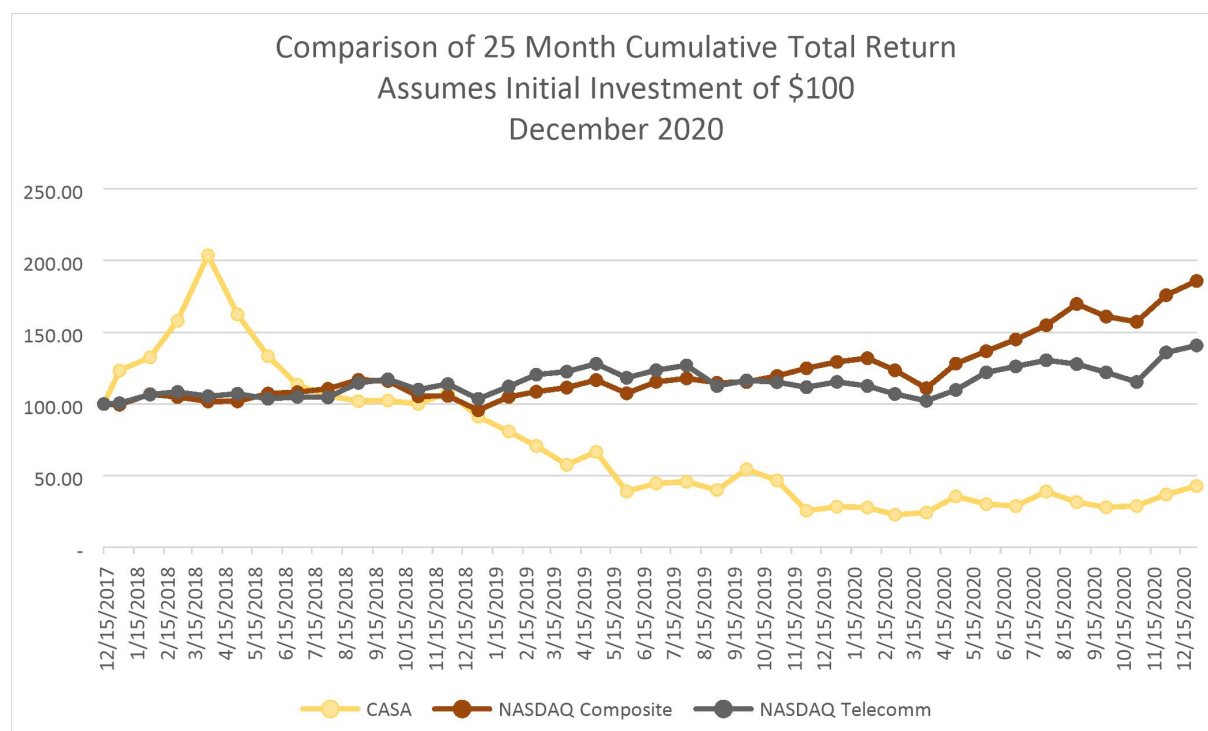
Dividend Policy

Although we declared special dividends on five occasions prior to our initial public offering, we do not anticipate that we will declare any cash dividends to holders of our common stock in the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on a number of factors, including future earnings, capital requirements, financial conditions, future prospects, contractual restrictions and covenants, and other factors that our board of directors may deem relevant. Our credit facility contains covenants that limit our ability to pay dividends on our capital stock.

Performance Graph

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

The following graph compares the cumulative total return to stockholders for our common shares for the period from December 15, 2017 (the date our common stock began trading on the Nasdaq Global Select Market) through December 31, 2020 with the Nasdaq Composite Index. The comparison assumes an investment of \$100 is made on December 15, 2017 in our common shares and in each of the indices and in the case of the indices it also assumes reinvestment of all dividends. The performance shown is not necessarily indicative of future performance.



Recent Sales of Unregistered Equity Securities

None.

Issuer Repurchases of Equity Securities

The following table sets forth information with respect to repurchases of shares of our common stock during the three-month period ended December 31, 2020.

Period	Total Number of Shares Purchased (In thousands)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (In thousands)	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs (1) (In thousands)
October 1 - October 31, 2020	—	\$ —	—	\$ 70,208
November 1 - November 30, 2020	—	\$ —	—	\$ 70,208
December 1 - December 31, 2020	—	\$ —	—	\$ 70,208

- (1) On February 21, 2019, we announced that our board of directors authorized the repurchase of up to \$75.0 million of our common stock under a stock repurchase program. From inception through December 31, 2020, we repurchased approximately 1.7 million shares under the program for approximately \$4.8 million before commissions. The stock repurchase program has no expiration date, does not require us to purchase a minimum number of shares, and may be suspended, modified or discontinued at any time without prior notice.

Use of Proceeds

On December 19, 2017, we closed our initial public offering of common stock under a registration statement on Form S-1 (File No. 333-221658) that was declared effective by the SEC on December 14, 2017. The net offering proceeds to us from the offering, after deducting underwriting discounts of \$6.3 million and offering expenses payable by us totaling \$4.1 million, were approximately \$79.3 million. No offering discounts, commissions or expenses were paid directly or indirectly to any of our directors or officers (or their associates) or persons owning 10.0% or more of any class of our equity securities or to any other affiliates. There has been no material change in the planned use of proceeds from our initial public offering as described in our final prospectus filed with the SEC on December 15, 2017, pursuant to Rule 424(b)(4) promulgated under the Securities Act. As of December 31, 2020, we had not used any of the net offering proceeds and we have invested the proceeds into an investment portfolio with the primary objective of preserving principal and providing liquidity without significantly increasing risk.

Item 6. Selected Financial Data.

Not Applicable.

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

The following discussion of our financial condition and results of operations should be read together with our consolidated financial statements and related notes and other financial information included elsewhere in this Annual Report on Form 10-K. The following discussion contains forward-looking statements that reflect our plans, estimates and beliefs. Our actual results could differ materially from those discussed in the forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Annual Report on Form 10-K, particularly in the section titled “Risk Factors.” For discussion comparing the period ended December 31, 2019 to December 31, 2018, please refer to our Annual Report on Form 10-K, filed with the SEC on February 27, 2020.

Overview

Our solutions are conceived, designed and built to enable our CSP customers to offer high bandwidth data services to their subscribers, and help them as they transform their networks to meet the growing demand for bandwidth and the introduction of new services. We offer physical, virtual and cloud-native 5G infrastructure and customer premise networking equipment for public and private high-speed data and multi-service communications networks. Our core and edge convergence technology enables CSPs and enterprises to cost-effectively and dynamically increase network speed, add bandwidth capacity and new services, reduce network complexity, and reduce operating and capital expenditures.

We offer scalable solutions that can meet the evolving bandwidth needs of our customers and their subscribers. Our first installation in a service provider’s network frequently involves deploying our broadband products in only a portion of the provider’s network and, for our cable products, with only a fraction of the capacity of our products enabled at the time of initial installation. Over time, our customers have generally expanded the use of our solutions to other areas of their networks to increase network capacity. Capacity expansions are accomplished either by deploying additional systems, line cards, or the sale of additional channels through the use of software. Sales of software-based capacity expansions generate higher gross margins than hardware-based deployments.

Our solutions are commercially deployed in over 70 countries by more than 475 customers, including regional service providers as well as some of the world’s largest Tier 1 CSPs, serving millions of subscribers.

COVID-19 Pandemic

The emergence of the coronavirus disease in 2019, or COVID-19, around the world, and particularly in the United States and China, and the accompanying responses of governments and businesses to the pandemic present various risks to us, not all of which we are able to fully evaluate or even foresee at the current time. While the COVID-19 pandemic did not significantly adversely affect our financial results, business operations or liquidity in the year ended December 31, 2020, economic and health conditions in the United States and across most of the globe changed rapidly during the year and are continuing to change after the end of the year. Globally to date, all aspects of our business remain fully operational, and our work from home contingency plans have been implemented and are operating successfully. The pandemic has resulted in increased demand for certain of our products and resulting order volumes have created additional pressure on our supply chain. To date, while the increased demand has not resulted in any material delays to our production cycle, we continue to work with our supply chain and contract manufacturers in an effort to ensure continued availability of all anticipated inventory requirements. However, we cannot at this time predict whether, or to what extent, our efforts will be successful. Additionally, we saw decreases in certain operating expenses, such as travel and trade show expense, during the year ended December 31, 2020 due to the COVID-19 pandemic that we cannot ensure will be maintained. We intend to continue to monitor our business very closely for any effects of COVID-19 for as long as necessary on an ongoing basis.

Due to the above circumstances and as described generally in this Annual Report on Form 10-K, our results of operations for the year ended December 31, 2020 are not necessarily indicative of the results to be expected in future years. Management cannot predict the full impact of the COVID-19 pandemic on our sales channels, supply chain, manufacturing and distribution, or on economic conditions generally, including the effects on our current and potential customers, who may temporarily accelerate or curtail spending on investments in current and/or new technologies, delay new equipment evaluations and trials, and possibly delay payments based on liquidity concerns, all of which could have a material impact on our business in the future. Similarly, our supply chain and our contract manufacturers could be affected, which could cause disruptions to our ability to meet customer demand. Although we have not been materially adversely impacted to date, we cannot predict the extent to which this may impact our future results of operations. If COVID-19 were to have such effects in the future, there would likely be a material adverse impact on our financial results, liquidity and capital resource needs. Thus, the ultimate extent of the effects of the COVID-19 pandemic on the Company is highly uncertain and dependent upon future developments, and such effects could exist for an extended period of time even after the pandemic might end.

Our Business Model

We derive revenue from sales of our products and services. Prior to the year ended December 31, 2020, the majority of our product revenue came from sales of our broadband products, particularly our C100G CCAP solution to cable operators worldwide. In the year ended December 31, 2020, sales of our wireless and fixed telco products to mobile network operators and diversified CSPs globally comprised a majority of our revenue. We generate service revenue primarily from sales of maintenance and support services, which end customers typically purchase in conjunction with our products, and, to a lesser extent, from sales of professional services and extended warranty services.

We offer end-to-end physical, virtual and cloud-native communications network infrastructure and customer premise network solutions that enable our customers to provide fixed and wireless ultra-broadband services to consumers and enterprises.

We market and sell our products and services through our direct global sales force, supported by sales agents, and through resellers. A majority of our revenue is derived from direct sales, which generate higher gross margins than sales made through resellers. Our sales organization includes systems engineers with deep technical expertise that provide pre-sales technical support. These systems engineers also assist with post-sales support. Our resellers receive an order from an end customer prior to placing an order with us, and we confirm the identification of or are aware of the end customer prior to accepting such orders. We use sales agents to assist our direct global sales force in the sales process with certain customers primarily located in Latin America and Asia-Pacific. If a sales agent is engaged in the sales process, we receive the order directly from and sell the products and services directly to the end customer, and we pay a commission to the sales agent, calculated as a percentage of the related customer payment.

Each of our sales teams is responsible for a geographic territory and/or has responsibility for a number of major direct end-customer accounts. We have a diverse, global customer base and our revenue by geographic region fluctuates from period to period based on the timing of customer projects. The percentages of our revenue derived from customers in each geographic region were as follows:

	Year Ended December 31,		
	2020	2019	2018
Revenue by geographic region:			
North America	42.3%	49.6%	49.1%
Latin America	8.9%	8.5%	10.9%
Europe, Middle East and Africa	9.1%	13.5%	27.4%
Asia-Pacific	39.7%	28.4%	12.6%
Total	100.0%	100.0%	100.0%

The increase in percentage of revenues in the Asia-Pacific region from the year ended December 31, 2019 to the year ended December 31, 2020 is attributed to the full-year contribution of Netcomm wireless and fixed telco device sales.

Our growth strategy focuses on the following key areas:

Continue to Innovate and Extend Technology Leadership Through R&D Investment

We believe that we offer market-leading broadband infrastructure products today. We intend to continue to enhance our existing products and develop new products in both our current and adjacent markets. For example, we have invested in and launched virtual CCAP solutions and distributed access architecture solutions to allow our cable customers to densify their networks, providing higher bandwidth, which enhances user experience. Additionally, we have been investing in, and have been recognizing revenue from, our core, access and customer premise technology products for 4G/LTE and 5G wireless networks.

Further Penetrate Existing Customers

Our customers often deploy our products in a specific region or for a specific application, which may only account for a portion of their overall network infrastructure needs. We plan to expand our footprint within the networks of existing customers as they realize the technological and financial benefits of our solutions, as well as sell our new products to them as they offer new broadband services to their subscribers.

Expand our Customer Base by Expanding the Breadth of Solutions Sold to Customers

We intend to sell additional products and solutions to our growing installed base of CSPs, particularly as they increasingly offer converged services to their subscribers. While we initially focused on providing broadband solutions for cable service providers due to our founders' experience in the cable industry, since our IPO we have expanded our products to include wireless and fixed telco solutions that we sell to cable operators, mobile network operators and diversified communications service providers globally.

Invest in Our Platform through Selective Acquisitions

We may selectively pursue acquisitions that are consistent with our overall growth strategy. For example, on July 1, 2019, we acquired NetComm for cash consideration of approximately \$162.0 million Australian dollars, or AUD (\$112.7 million United States dollars, or USD), based on an exchange rate of USD \$0.700 per AUD \$1.00 on July 1, 2019). This acquisition has enabled us to expand our customer base, enhance our global footprint, extend our product portfolio to the customer premise networking technology and further diversify our revenue sources. As discussed in further detail below, the NetComm acquisition had a material impact on our business and is expected to have a material impact on our future performance.

Key Components of Our Results of Operations

Revenue

We generate product revenue from sales of next-generation physical, virtual and cloud-native architectures for cable broadband, fixed-line broadband and wireless broadband networks. Our products enable our service provider customers to cost-effectively deliver ultra-broadband services to their consumer and enterprise customers.

Our acquisition of NetComm on July 1, 2019 expanded our product offerings to include fixed wireless access, fixed broadband and FTTdp devices. The results for the year ended December 31, 2020 included a full year of incremental revenues as compared to the year ended December 31, 2019, which included such revenues only for the six-month period from July 1, 2019 through December 31, 2019.

We generate service revenue from sales of initial maintenance and support services contracts, which are typically purchased by end customers in conjunction with our products, and from our customers' subsequent annual renewals of those contracts. We offer maintenance and support services under renewable, fee-based contracts, which include telephone support and unspecified software upgrades and updates provided on a when-and-if-available basis. To a lesser extent, we generate service revenue from sales of professional services, such as installation and configuration, and extended warranty services.

The sale of our products generally includes a 90-day warranty on the software and a one-year warranty on the hardware component of the products, which includes repair or replacement of the applicable hardware. We record a warranty accrual for the initial software and hardware warranty included with our product sales and do not defer revenue. In addition, in conjunction with customers' renewals of maintenance and support services contracts, we offer an extended warranty for periods typically of one to three years for agreed-upon fees, which we record as service revenue.

Cost of Revenue

Our cost of product revenue consists primarily of the costs of procuring goods, such as CCAP chassis, cable access products, line cards embedded with Field Programmable Gate Arrays (or FPGAs) and components for our fixed wireless access and FTTdp devices. In addition, cost of product revenue includes salary and benefit expenses, including stock-based compensation, for manufacturing and supply-chain management personnel, allocated facilities-related costs, estimated warranty costs, third-party logistics costs, and estimated costs associated with excess and obsolete inventory.

Our cost of service revenue includes salary and benefit expenses, including stock-based compensation, for our maintenance and support services and professional services personnel, fees incurred for subcontracted professional services provided to our customers, and allocated facilities-related costs.

Gross Profit

Our product gross profit and gross margin have been, and may in the future be, influenced by several factors, including changes in the volume of our software products sold, product configuration, sales of capacity expansions, geographic location of our customers, pricing due to competitive pressure, estimated warranty costs, inventory obsolescence, and favorable and unfavorable changes in inventory production volume and component costs. As some products mature, the average selling prices of those products may decline. In addition, gross margins on customer premise devices are lower than on our legacy broadband hardware products. Our service gross profit and gross margin have been, and may in the future be, influenced by the amount and timing of renewals of maintenance and support services contracts by customers, pricing due to competitive pressure and, to a lesser extent, the amount of professional services ordered by customers and performed by us. We expect that our gross margin will decline for the year ended December 31, 2020 as compared to the year ended December 31, 2019 due to higher sales volumes of lower margin customer premise products and changes in the percentage of revenue attributable to our software products and capacity expansions.

Operating Expenses

Our operating expenses consist of research and development and selling, general and administrative expenses.

Research and Development Expenses

Research and development expenses consist primarily of salary and benefit expenses, including stock-based compensation, for our employees engaged in research, design and development activities. Research and development expenses also include project-specific engineering services purchased from external vendors, prototype costs, depreciation expense, amortization of purchased intellectual property, allocated facilities-related costs and travel expenses.

We expect that our research and development costs may increase in the near term as we continue to make investments to enhance our existing products, develop new products and technologies, including our new wireless and fixed telco solutions, and in the event that any expense reductions related to COVID-19 cease.

Selling, General and Administrative Expenses

Selling, general and administrative expenses include salary and benefit expenses, including stock-based compensation, for employees and costs for contractors engaged in sales, marketing, general and administrative activities. Selling, general and administrative expenses also include commissions, calculated as a percentage of the related customer payment, to sales agents that assist us in the sales process with certain customers primarily located in the Latin America and Asia-Pacific regions. These sales agent commissions fluctuate from period to period based on the amount and timing of sales to the customers subject to sales agent commissions. Selling, general and administrative expenses also include marketing activities, such as travel expenses, trade shows, marketing programs and promotional materials, as well as allocated facilities-related costs.

We expect that our selling, general and administrative expenses may increase in the near term as we continue to make investments in our sales and marketing organizations, expand our marketing programs and efforts to increase the market awareness and sales of our products and services, and in the event that any expense reductions related to COVID-19 cease.

Other Income (Expense), Net

Other income (expense), net consists of interest income from our investments in short-term financial instruments, such as certificates of deposit and money market mutual funds, and interest expense associated with our term loan and revolving credit facilities and debt maintenance costs related to our revolving credit facility. Other income (expense), net also includes realized and unrealized gains and losses from foreign currency transactions. We hedge certain significant transactions denominated in currencies other than the U.S. dollar, and we expect to continue to do so to minimize our exposure to foreign currency fluctuations.

(Benefit from) Provision for Income Taxes

We are subject to income taxes in the United States and the foreign jurisdictions in which we do business. These foreign jurisdictions have statutory tax rates different from those in the United States. Our effective tax rates will vary depending on the relative proportion of foreign to U.S. income, the utilization of foreign tax credits and research and development tax credits, changes in corporate structure, the amount and timing of certain employee stock-based

compensation transactions, changes in the valuation of our deferred tax assets and changes in tax laws and interpretations. We plan to regularly assess the likelihood of outcomes that could result from the examination of our tax returns by the U.S. Internal Revenue Service and other tax authorities to determine the adequacy of our income tax reserves and expense. Should actual events or results differ from our then-current expectations, charges or credits to our provision for income taxes may become necessary. Any such adjustments could have a significant effect on our results of operations.

For taxable years beginning after January 1, 2018, taxpayers are subjected to the global intangible low-taxed income provisions, or GILTI provisions. The GILTI provisions require us to currently recognize in U.S. taxable income, a deemed dividend inclusion of foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary's tangible assets. The ability to benefit from a deduction and foreign tax credits against a portion of the GILTI income may be limited under the GILTI rules as a result of the utilization of net operating losses, foreign sourced income, and other potential limitations within the foreign tax credit calculation. For the years ended December 31, 2020 and 2019, we recorded an income tax charge of \$3.5 and \$0.9 million, respectively, related to GILTI. We have made an accounting policy election, as allowed by the SEC and FASB, to recognize the impacts of GILTI within the period incurred. Therefore, no U.S. deferred taxes are provided on GILTI inclusions of future foreign subsidiary earnings.

Results of Operations

The following tables set forth our consolidated results of operations in dollar amounts and as a percentage of total revenue for the periods shown:

	Year Ended December 31,		
	2020	2019	2018
	(in thousands)		
Revenue:			
Product	\$ 346,083	\$ 241,377	\$ 256,989
Service	47,163	40,920	40,138
Total revenue	393,246	282,297	297,127
Cost of revenue⁽¹⁾:			
Product	187,706	113,059	74,350
Service	4,941	6,706	4,811
Total cost of revenue	192,647	119,765	79,161
Gross profit	200,599	162,532	217,966
Operating expenses:			
Research and development ⁽¹⁾	84,370	83,331	70,974
Selling, general and administrative ⁽¹⁾	92,016	88,320	68,026
Total operating expenses	176,386	171,651	139,000
Income (loss) from operations	24,213	(9,119)	78,966
Other income (expense), net	(14,464)	(15,296)	(13,028)
Income (loss) before (benefit from) provision for income taxes	9,749	(24,415)	65,938
(Benefit from) provision for income taxes	(15,052)	23,791	(7,068)
Net income (loss)	\$ 24,801	\$ (48,206)	\$ 73,006

(1) Includes stock-based compensation expense related to stock options, stock appreciation rights and restricted stock units granted to employees and non-employee consultants as follows:

	Year Ended December 31,		
	2020	2019	2018
	(in thousands)		
Cost of revenue	\$ 153	\$ 216	\$ 249
Research and development expense	2,447	1,569	1,864
Selling, general and administrative expense	10,555	8,036	6,781
Total stock-based compensation expense	\$ 13,155	\$ 9,821	\$ 8,894

	Year Ended December 31,		
	2020	2019	2018
	(as a percentage of total revenue)		
Revenue:			
Product	88%	86%	86%
Service	12	14	14
Total revenue	100	100	100
Cost of revenue:			
Product	48	40	25
Service	1	2	2
Total cost of revenue	49	42	27
Gross profit	51	58	73
Operating expenses:			
Research and development	21	30	24
Selling, general and administrative	23	31	23
Total operating expenses	45	61	47
Income (loss) from operations	6	(3)	27
Other income (expense), net	(4)	(5)	(4)
Income (loss) before (benefit from) provision for income taxes	2	(9)	22
(Benefit from) provision for income taxes	(4)	8	(2)
Net income (loss)	6%	(17)%	25%

Percentages in the table above are based on actual values. As a result, some totals may not sum due to rounding.

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019

Revenue

	Year Ended December 31,				Change	
	2020		2019		Amount	%
	Amount	% of Total	Amount	% of Total		
	(dollars in thousands)					
Revenue:						
Product	\$ 346,083	88.0%	\$ 241,377	85.5%	\$ 104,706	43.4%
Service	47,163	12.0%	40,920	14.5%	6,243	15.3%
Total revenue	\$ 393,246	100.0%	\$ 282,297	100.0%	\$ 110,949	39.3%
Revenue by geographic region:						
North America	\$ 166,177	42.3%	\$ 139,917	49.6%	\$ 26,260	18.8%
Latin America	34,926	8.9%	24,043	8.5%	10,883	45.3%
Europe, Middle East and Africa	35,933	9.1%	38,154	13.5%	(2,221)	(5.8)%
Asia-Pacific	156,210	39.7%	80,183	28.4%	76,027	94.8%
Total revenue	\$ 393,246	100.0%	\$ 282,297	100.0%	\$ 110,949	39.3%

	Year Ended December 31,		Change	
	2020	2019	Amount	%
Product revenue:				
Wireless	\$ 111,255	\$ 58,234	\$ 53,021	91.0%
Fixed telco	96,904	38,734	58,170	150.2%
Cable	137,924	144,409	(6,485)	(4.5)%
Total product revenue	346,083	241,377	104,706	43.4%
Service revenue				
Wireless	7,348	1,701	5,647	332.0%
Fixed telco	1,924	773	1,151	148.9%
Cable	37,891	38,446	(555)	(1.4)%
Total service revenue	47,163	40,920	6,243	15.3%
Total revenue	\$ 393,246	\$ 282,297	\$ 110,949	39.3%

The increase in product revenue was primarily attributed to the full-year contribution of NetComm revenue which was also the primary factor for the product revenue increases in the Asia-Pacific and North America geographic regions. In addition, along with increased demand for the fixed and wireless devices, several new products were introduced to both new and existing customers. Also, in 2020 fixed wireless access gained market acceptance becoming a mainstream technology. We also experienced an increase of virtualization of fixed wireless network cores. Finally, additional revenues were driven by an increase in new customers for both fixed and wireless technologies.

The increase in service revenue was primarily due to increased product revenues and new service agreements with certain large wireless customers.

Cost of Revenue and Gross Profit

	Year Ended December 31,		Change	
	2020	2019	Amount	%
(dollars in thousands)				
Cost of revenue:				
Product	\$ 187,706	\$ 113,059	\$ 74,647	66.0%
Service	4,941	6,706	(1,765)	(26.3)%
Total cost of revenue	\$ 192,647	\$ 119,765	\$ 72,882	60.9%

	Year Ended December 31,		Change			
	2020	2019	Amount	Gross Margin (bps)		
(dollars in thousands)						
Gross profit:						
Product	\$ 158,377	45.8%	\$ 128,318	53.2%	\$ 30,059	(740)
Service	42,222	89.5%	34,214	83.6%	8,008	590
Total gross profit	\$ 200,599	51.0%	\$ 162,532	57.6%	\$ 38,067	(660)

The increase in cost of product revenue and decrease in product gross margin was attributed to increased revenue and sales of lower margin NetComm wireless and fixed telco devices for the full calendar year of 2020.

The decrease in cost of service revenue and increase in service gross profit was primarily due to less utilization of third-party professional services.

Research and Development

	Year Ended December 31,		Change	
	2020	2019	Amount	%
	(dollars in thousands)			
Research and development	\$ 84,370	\$ 83,331	\$ 1,039	1.2%
Percentage of revenue	21.5%	29.5%		

The increase in research and development expense was primarily due to the acquisition of NetComm, including a \$0.3 million increase in personnel-related costs, net of the impact of headcount reductions made in the three months ended December 31, 2019 and reduced employee travel in 2020 due to COVID-19. In addition, there was an increase in purchases of research and development materials of \$1.0 million and increased professional services of \$0.2 million also due to the acquisition of Netcomm, net of a decrease in depreciation expense of \$0.5 million as fully-depreciated items were not replaced in 2020.

Selling, General and Administrative

	Year Ended December 31,		Change	
	2020	2019	Amount	%
	(dollars in thousands)			
Selling, general and administrative	\$ 92,016	\$ 88,320	\$ 3,696	4.2%
Percentage of revenue	23.4%	31.3%		

The increase in selling, general and administrative expense was primarily due to a \$4.1 million increase in personnel-related costs, mainly from the acquisition of NetComm, in addition to increased commissions due to increased revenue, and increased variable compensation in 2020, net of the impact of headcount reductions made in the three months ended December 31, 2019 and reduced travel in 2020 due to COVID-19. In addition, there was an increase in facilities costs of \$1.1 million and depreciation and amortization of \$1.8 million also due to the NetComm acquisition. The increases were partially offset by a decrease in professional services of \$0.5 million due to acquisition-related costs in 2019, decreased trade show expense of \$1.7 million due to COVID-19, a \$0.4 million reduction in bad debt expense and a decrease of \$0.7 million in other taxes.

Other Income (Expense), Net

	Year Ended December 31,		Change	
	2020	2019	Amount	%
	(dollars in thousands)			
Other income (expense), net	\$ (14,464)	\$ (15,296)	\$ 832	(5.4)%
Percentage of revenue	(3.7)%	(5.4)%		

The change in other income (expense) was primarily due to a \$3.4 million decrease in interest income due to a decrease in our portfolio of cash equivalents following our acquisition of NetComm in July 2019, offset by a \$3.6 million decrease in interest expense due to decreases in both the outstanding principal and the interest rate on our term loan facility. Foreign currency exchange loss (gain) resulted in an increase to other income of \$0.2 million primarily due to fluctuation in the Australian dollar and the China Renminbi exchange rates. Other income increased \$0.5 million due to grants received and COVID-19 relief in Asia during 2020.

(Benefit from) Provision for Income Taxes

	Year Ended December 31,		Change	
	2020	2019	Amount	%
	(dollars in thousands)			
(Benefit from) provision for income taxes	\$ (15,052)	\$ 23,791	\$ (38,843)	(163.3)%
Effective tax rate	(154.4)%	(97.4)%		

The change in our (benefit from) provision for income taxes primarily relates to the recognition of a \$23.5 million tax benefit during the year ended December 31, 2020 from the carryback of the 2019 and 2020 U.S. net operating losses as a result of the CARES Act enacted during the year. During the year ended December 31, 2019, we recorded a valuation allowance against our net U.S. deferred tax assets resulting in tax expense of \$35.2 million. The change in our (benefit from) provision for income taxes was also impacted by changes in the geographical mix of earnings and the impact of our U.S. GILTI inclusion.

Liquidity and Capital Resources

Since our initial public offering in December 2017, through which we received \$79.3 million, our operations have been funded primarily by cash flows from operations.

On July 1, 2019, we acquired 100% of the equity interests in NetComm for cash consideration of \$162.0 million Australian dollars, or AUD (\$112.7 million USD, based on an exchange rate of USD \$0.700 per AUD \$1.00 on July 1, 2019), using amounts included in restricted cash in the consolidated balance sheet as of June 30, 2019. In addition, we recognized advisory fee expenses of \$1.5 million, which became due and payable upon the closing of the acquisition.

The following tables set forth our cash and cash equivalents and working capital as of December 31, 2020, 2019 and 2018 as well as our net cash flows for the years ended December 31, 2020, 2019 and 2018:

	As of December 31,		
	2020	2019	2018
	(in thousands)		
Consolidated Balance Sheet Data:			
Cash and cash equivalents	\$ 157,455	\$ 113,638	\$ 280,587
Working capital	251,573	213,977	328,400
	Year Ended December 31,		
	2020	2019	2018
	(in thousands)		
Consolidated Cash Flow Data:			
Net cash provided by (used in) operating activities	\$ 53,642	\$ (39,022)	\$ 98,545
Net cash used in investing activities	(5,585)	(118,022)	(7,966)
Net cash used in financing activities	(6,303)	(9,527)	(68,351)

As of December 31, 2020, we had cash and cash equivalents of \$157.5 million and net accounts receivable of \$94.3 million. We maintain a \$25.0 million revolving credit facility, under which we have drawn \$6.5 million and \$1.5 million of availability was used as collateral for two stand-by letters of credit, leaving availability of \$17.0 million as of December 31, 2020.

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

From our inception through December 31, 2020, our board of directors has declared a special dividend on five separate occasions and has approved cash payments to the holders of our stock options, stock appreciation rights, or SARs, and restricted stock units, or RSUs, as equitable adjustments in connection with these special dividends. The dividend payments totaled \$0.9 million in the year ended December 31, 2018. No dividend payments were made during the years ended December 31, 2020 or 2019. The equitable adjustment payments totaled \$0.7 million, \$2.6 million and \$7.3 million in the years ended December 31, 2020, 2019 and 2018, respectively. As of December 31, 2020, there were \$0.1 million of equitable adjustment payments that had been approved by our board of directors that had not yet been paid to the holders of our stock

options, SARs and RSUs. These equitable adjustment payments will be paid to the holders of the applicable equity awards as they vest through 2021. We do not anticipate declaring cash dividends in the foreseeable future. Any future determination to declare dividends will be subject to the discretion of our board of directors and applicable law, and will depend on various factors, including our results of operations, financial condition, prospects and any other factors deemed relevant by our board of directors.

Cash Flows

Operating Activities

Our primary source of cash from operating activities has been from cash collections from our customers. We expect cash inflows from operating activities to be affected by increases in sales and timing of collections and by purchases and shipments of inventory. Our primary uses of cash from operating activities have been for personnel costs and investment in sales and marketing and research and development. We expect cash outflows from operating activities to increase as a result of further investment in research and development and sales and marketing and increases in personnel costs as we continue to enhance our products and introduce new products in an effort to continue to expand our business.

During the year ended December 31, 2020, cash provided by operating activities was \$53.6 million, primarily resulting from our net income of \$24.8 million and net non-cash expenses of \$30.4 million, partially offset by net cash used in changes in our operating assets and liabilities of \$1.5 million. The net cash used in changes in our operating assets and liabilities during the year ended December 31, 2020 was primarily due to an \$11.7 million increase in prepaid income taxes, an \$11.1 million decrease in deferred revenue due to the timing of orders during the year; and a \$9.8 million increase in inventory due to manufacturing to fill existing orders and to meet anticipated future demand for our products. These outflows of cash were partially offset by a \$17.0 million increase in accounts payable due to the timing of vendor payments, a \$6.3 million increase in accrued expenses due to the timing of payments, a \$5.3 million increase in accrued income taxes, and a \$2.8 million decrease in prepaid expenses and other assets.

Investing Activities

Prior to the NetComm acquisition on July 1, 2019, our investing activities consisted primarily of expenditures for lab and computer equipment and software to support the development of new products and increase our manufacturing capacity to meet customer demand for our products. In addition, our investing activities included expansion of and improvements to our facilities. As our business expands, we expect that we will continue to invest in these areas.

Net cash used in investing activities during the year ended December 31, 2020 was \$5.6 million and consisted of purchases of property and equipment of \$5.2 million and purchases of software licenses of \$0.4 million.

Financing Activities

Net cash used in financing activities during the year ended December 31, 2020 was \$6.3 million and consisted of debt principal repayments of \$9.6 million, repurchases of common stock of \$3.0 million, dividend and equitable adjustment payments of \$0.7 million, and payment of taxes on behalf of our employees related to net share settlement of equity awards of \$0.6 million, partially offset by borrowings under our revolving credit facility of \$6.5 million and proceeds from the exercise of stock options of \$1.2 million.

Commercial Mortgage Loan

In July 2015, we entered into an \$8.0 million commercial mortgage loan agreement, which matured on July 1, 2020. On July 1, 2020, we paid in full the remaining \$6.5 million in unpaid principal and accrued interest under the mortgage loan with funds drawn upon our revolving credit facility. The annual interest rate on the loan was 3.5%, and the loan was repayable in 60 monthly installments of principal and interest based on a 20-year amortization schedule. The loan was secured by the land and building, which are our corporate offices, purchased in March 2015, and contained annual affirmative, negative and financial covenants, including maintenance of a minimum debt service ratio. The covenants were measured annually and we were in compliance with all the covenants of the mortgage loan as of December 31, 2019. As of December 31, 2019, the outstanding principal amount under the mortgage loan was \$6.6 million.

Term Loan and Revolving Credit Facilities

On December 20, 2016, we entered into a credit agreement with JPMorgan Chase Bank, N.A., as administrative agent, various lenders and JPMorgan Chase Bank, N.A. and Barclays Bank PLC, as joint lead arrangers and joint bookrunners, providing for:

- a term loan facility of \$300.0 million; and
- a revolving credit facility of up to \$25.0 million in revolving credit loans and letters of credit.

As of December 31, 2020 and 2019, we had borrowings of \$288.8 million and \$291.0 million, respectively, outstanding under the term loan facility. As of December 31, 2020, we had borrowings of \$6.5 million under the revolving credit facility, which were drawn down to fund the repayment of our commercial mortgage loan. We had no outstanding borrowings under the revolving credit facility at December 31, 2019. As of December 31, 2020 and 2019, we had also used \$1.5 million and \$1.3 million, respectively, under the revolving credit facility for two stand-by letters of credit, one which serves as collateral to one of our customers pursuant to a contractual obligations and one which is used as collateral for operating leases in Australia. In addition, we may, subject to certain conditions, including the consent of the administrative agent and the institutions providing such increases, increase the facilities by an unlimited amount so long as we are in compliance with specified leverage ratios, or otherwise by up to \$70.0 million.

Borrowings under the facilities bear interest at a floating rate, which can be either a Eurodollar rate plus an applicable margin or, at our option, a base rate (defined as the highest of (x) the JPMorgan Chase, N.A. prime rate, (y) the federal funds effective rate, plus one-half percent (0.50%) per annum and (z) a one-month Eurodollar rate plus 1.00% per annum) plus an applicable margin. The applicable margin for borrowings under the term loan facility is 4.00% per annum for Eurodollar rate loans (subject to a 1.00% per annum interest rate floor) and 3.00% per annum for base rate loans. The applicable margin for borrowings under the revolving credit facility is 1.75% per annum for Eurodollar rate loans and 0.75% per annum for base rate loans, subject to reduction based on our maintaining specified net leverage ratios. The interest rates payable under the facilities are subject to an increase of 2.00% per annum during the continuance of any payment default.

For Eurodollar rate loans, we may select interest periods of one, three or six months or, with the consent of all relevant affected lenders, twelve months. Interest will be payable at the end of the selected interest period, but no less frequently than every three months within the selected interest period. Interest on any base rate loan is not set for any specified period and is payable quarterly. We have the right to convert Eurodollar rate loans into base rate loans and the right to convert base rate loans into Eurodollar rate loans at our option, subject, in the case of Eurodollar rate loans, to breakage costs if the conversion is effected prior to the end of the applicable interest period. As of December 31, 2020, the interest rate on our borrowings under the term loan facility was 5.00% per annum, which was based on a six-month Eurodollar rate at the applicable floor of 1.00% per annum plus the applicable margin of 4.00% per annum for Eurodollar rate loans. As of December 31, 2019, the interest rate on the term loans was 5.80% per annum, which was based on a one-month Eurodollar rate at the applicable floor of 1.80% per annum plus the applicable margin of 4.00% per annum for Eurodollar rate loans.

The revolving credit facility also requires payment of quarterly commitment fees at a rate of 0.25% per annum on the difference between committed amounts and amounts actually borrowed under the facility and customary letter of credit fees.

The term loan facility matures on December 20, 2023 and the revolving credit facility matures on December 20, 2021. The term loan facility is subject to amortization in equal quarterly installments, which commenced on March 31, 2017, of principal in an annual aggregate amount equal to 1.0% of the original principal amount of the term loans of \$300.0 million, with the remaining outstanding balance payable at the date of maturity.

Voluntary prepayments of principal amounts outstanding under the term loan facility are permitted at any time; however, if a prepayment of principal is made with respect to a Eurodollar loan on a date other than the last day of the applicable interest period, we are required to compensate the lenders for any funding losses and expenses incurred as a result of the prepayment. Prior to the revolving credit facility maturity date, funds borrowed under the revolving credit facility may be borrowed, repaid and reborrowed, without premium or penalty.

In addition, we are required to make mandatory prepayments under the facilities with respect to (i) 100% of the net cash proceeds from certain asset dispositions (including casualty and condemnation events) by us or certain of our subsidiaries, subject to certain exceptions and reinvestment provisions, (ii) 100% of the net cash proceeds from the issuance or incurrence of any additional debt by us or certain of our subsidiaries, subject to certain exceptions, and (iii) 50% of our excess cash flow, as defined in the credit agreement, subject to reduction upon our achievement of specified performance

targets. In accordance with these provisions, a mandatory prepayment of \$6.8 million will be required, no later than May 5, 2021.

The facilities are secured by, among other things, a first priority security interest, subject to permitted liens, in substantially all of our assets and all of the assets of certain of our subsidiaries and a pledge of certain of the stock of certain of our subsidiaries, in each case subject to specified exceptions. The facilities contain customary affirmative and negative covenants, including certain restrictions on our ability to pay dividends, and, with respect only to the revolving credit facility, a financial covenant requiring us to maintain a specified total net leverage ratio, in the event that on the last day of any fiscal quarter, we have utilized more than 30% of our borrowing capacity under the revolving credit facility (subject to certain exceptions). The term loan facility contains a cross-default provision, whereby, if repayment of borrowings under the revolving credit facility are accelerated due to a default of the net leverage ratio covenant, repayment of the outstanding term loan balance could also be accelerated. Because the financial covenant under the revolving credit facility only applies if outstanding utilization thereunder exceeds 30% of the total borrowing capacity on the last day of each fiscal quarter, this cross-default provision has the effect of limiting our ability to utilize more than 30% of our total borrowing capacity under the revolving credit facility of \$25.0 million if both our net leverage ratio exceeds the maximum permitted by the agreement and we would not otherwise be able to reduce our outstanding utilization of the revolving credit facility to below the 30% testing threshold prior to the last day of any quarter. As of December 31, 2020, our net leverage ratio did not exceed the maximum. As of December 31, 2019, our net leverage ratio exceeded the maximum; however, as our utilization of the revolving credit facility did not exceed the 30% testing threshold on December 31, 2019, we were not in default on the revolving credit facility as a result of our net leverage ratio exceeding the maximum permitted amount. We were in compliance with all applicable covenants of the facilities as of December 31, 2020 and with all other applicable covenants as of December 31, 2019. We do not expect to require the use of the revolving credit facility to fund operations during the next 12 months.

Tax Cuts and Jobs Act

Of our total cash and cash equivalents of \$157.5 million as of December 31, 2020, \$122.8 million was held by our foreign subsidiaries. The Tax Cuts and Jobs Act, or TCJA, established a modified territorial system requiring a mandatory deemed repatriation tax on undistributed earnings of foreign subsidiaries. In December 2017, we recorded a charge related to a one-time deemed repatriation of accumulated earnings of foreign subsidiaries. Our accounting for the impacts of the TCJA was complete as of December 31, 2018 and we had not recorded any material adjustments to the provisional amounts recorded in 2017 related to the TCJA. As a result, applicable U.S. corporate income taxes have been provided on substantially all of our accumulated earnings of foreign subsidiaries. Beginning in 2018, the TCJA also required a minimum tax on certain future earnings generated by foreign subsidiaries while providing future tax-free repatriation of such earnings through a 100% dividends-received deduction.

While the intent of TCJA was to provide for a territorial tax system, effective for taxable years beginning after January 1, 2018, taxpayers are subjected to the Global Intangible Low-Taxed Income, or GILTI, provisions. The GILTI provisions require us to currently recognize in U.S. taxable income, a deemed dividend inclusion of foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary's tangible assets. For the years ended December 31, 2020 and 2019 we recorded income tax charges of \$3.5 million and \$0.9 million, respectively, related to GILTI.

Stock Repurchase Program

On February 21, 2019, we announced a stock repurchase program under which we were authorized to repurchase up to \$75.0 million of our common stock. During the years ended December 31, 2020 and 2019, we repurchased 1.2 million and 0.5 million shares of our common stock for approximately \$3.0 million and \$1.8 million, before commissions, respectively. As of December 31, 2020, approximately \$70.2 million remained authorized for repurchases of our common stock under the stock repurchase program. The stock repurchase program has no expiration date, does not require us to purchase a minimum number of shares, and may be suspended, modified or discontinued at any time without prior notice.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements included elsewhere in this Annual Report on Form 10-K, which have been prepared in accordance with accounting principles generally accepted in the United States of America, or GAAP. In preparing our consolidated financial statements, we make estimates, assumptions and judgments that can have a significant effect on our reported revenue, results of operations and net income or loss, as well as on the value of certain assets and liabilities on our balance sheet during and as of the reporting periods. These estimates, assumptions and judgments are necessary because future events and their effects

on our results and the value of our assets cannot be determined with certainty and are made based on our historical experience and on other assumptions that we believe to be reasonable under the circumstances. We evaluate our estimates and assumptions on an ongoing basis. These estimates may change as new events occur or additional information is obtained, and we may periodically be faced with uncertainties, the outcomes of which are not within our control and may not be known for a prolonged period of time. As the use of estimates is inherent in the financial reporting process, actual results could differ from those estimates.

While our significant accounting policies are described in more detail in Note 2 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

Effective January 1, 2019, we adopted ASC Topic 606, Revenue from Contracts with Customers, or “ASC 606”, using the modified retrospective transition method. We applied this method to contracts that were not complete as of the date of initial application. The following is a summary of new and/or revised significant accounting policies affected by our adoption of ASC 606, which relate primarily to revenue and cost recognition.

We generate revenue from sales of our products, along with associated maintenance, support and extended hardware warranty services, and, to a lesser extent, from sales of professional services. We also generate revenue from sales of additional line cards and software-based capacity expansions. Maintenance and support services include telephone support, bug fixes and unspecified software upgrades and updates provided on a when-and-if-available basis and/or extended hardware warranty.

In our consolidated statements of operations and comprehensive income (loss), we classify revenue from sales of cable products, wireless and fixed telco devices as product revenue, and revenue from maintenance and support and professional services as service revenue.

In accordance with ASC 606, we recognize revenue when a customer obtains control of promised products or services. The amount of revenue recognized reflects the consideration that we expect to be entitled to receive in exchange for these products or services. To achieve the core principle of this standard, we apply the following five steps:

1) *Identify the contract with a customer* – We consider binding contracts and/or purchase orders to be customer contracts, provided collection is probable. We assess collectability based on a number of factors that generally include information supplied by credit agencies, references and/or analysis of customer accounts and payment history. We combine contracts with customers if those contracts were negotiated as a single deal or contain price dependencies.

2) *Identify the performance obligations in the contract* – We identify performance obligations as products and services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the product or service either on its own or together with other resources that are readily available from third parties or from us, and are distinct in the context of the contract, whereby the transfer of the products or services is separately identifiable from other promises in the contract.

3) *Determine the transaction price* – We determine the transaction price based on the consideration to which we expect to be entitled in exchange for transferring products or services to the customer. We include variable consideration in the transaction price if, in our judgment, it is probable that no significant future reversal of cumulative revenue under the contract will occur.

4) *Allocate the transaction price to performance obligations in the contract* – We allocate the transaction price to performance obligations based on a relative standalone selling price, or SSP.

5) *Recognize revenue when or as we satisfy a performance obligation* – We recognize revenue from product sales upon delivery to the customer, which is generally when control of the asset has passed to the customer. Support revenue is generally recognized over the contract period once the associated product’s control has been passed to the customer. Finally, for professional services, we recognize revenue for the fee-based arrangements upon completion of the service and receipt of acceptance, if applicable.

Performance Obligations

The majority of our contracts with customers contain multiple performance obligations including products and maintenance services, and on a limited basis, professional services. For these contracts, we account for individual performance obligations separately if they are considered distinct. We consider our cable, wireless and fixed telco products,

maintenance services and professional services as distinct performance obligations. When multiple performance obligations exist in a customer contract, we allocate the transaction price to the separate performance obligations on a relative SSP basis. We determine SSP using our judgment and based on the best evidence available which may include the selling price of products when sold on a standalone basis to similar customers in similar circumstances, or in the absence of standalone sales, taking into consideration our historical pricing practices by customer type, selling method (i.e. resellers or direct), and geographic-specific market factors.

Product revenue

Our cable, wireless and fixed telco products generally have both software and non-software (i.e., hardware) components that function together to deliver the products' essential functionality. Our hardware generally cannot be used apart from the embedded software and is considered one distinct performance obligation. We recognize revenue for both new and existing customers at a point in time when control of the products is transferred to the customer, which is typically when title and risk of loss have transferred and the right to payment is enforceable. We also earn revenue from the sale of perpetual software licenses and/or software-enabled capacity expansions. Revenue on perpetual software licenses and software-enabled capacity expansions for existing customers are also distinct performance obligations as they are separately identifiable and provide additional bandwidth capacity on hardware products already purchased by the customer. We recognize revenue on perpetual software licenses and software-enabled capacity expansions when control is transferred, which is typically as the software entitlements are made available to the customer.

When customer contracts require acceptance of product and services, we consider the nature of the acceptance provisions to determine if they are substantive or considered perfunctory to determine if these acceptance provision impact the timing of revenue recognition. When acceptance provisions are considered substantive, we will defer revenue on all performance obligations in the contract subject to acceptance until acceptance has been received. We do not defer revenue when acceptance provisions are deemed perfunctory.

Maintenance and Support Services and Professional Services Revenue

We generally sell our products with maintenance and support services, a distinct performance obligation that includes the stand-ready obligation to provide telephone support, bug fixes and unspecified software upgrades and updates provided on a when-and-if-available basis and/or extended hardware warranty. After the initial sale, customers may purchase annual renewals of support contracts. Our telephone support and unspecified upgrades and updates are delivered over time and we therefore recognize revenue ratably over the contract term, which is typically one year, but can be as long as five years. We also generate revenue from sales of professional services, such as installation, configuration and training. Professional services are a distinct performance obligation since our products are functional without these services and can generally be performed by the customer or a third party. We generally recognize fee-based professional services delivered at a point in time as the professional services are completed and upon receipt of acceptance if applicable.

The sale of our products generally includes a 90-day warranty on the software and a one-year warranty on the hardware component of the products, which includes repair or replacement of the applicable hardware. We include these warranties to ensure the products perform in accordance with our specifications and are therefore not a performance obligation. We record a warranty accrual for the initial software and hardware warranty included with product sales and do not defer revenue.

Resellers and Sales Agents

We market and sell our products through its direct global sales force, supported by sales agents, and through resellers. Our resellers receive an order from an end customer prior to placing an order with us, and we confirm the identification of or are aware of the end customer prior to accepting such order. We invoice the reseller an amount that reflects a reseller discount and record revenue based on the amount of the discounted transaction value. Aside from wireless and fixed telco hardware products, our resellers do not stock inventory received from us.

When we transact with a reseller, the contract is with the reseller and not with the end customer. Whether we transact business with and receive the order from a reseller or directly from an end customer, our revenue recognition policy and resulting pattern of revenue recognition for the order are the same.

We have assessed whether we are the principal (i.e., reports revenues on a gross basis) or agent (i.e., reports revenues on a net basis) by evaluating whether we have control of the good or service before it is transferred to the customer. Generally, we control the promised good or service before transferring it to the customer and acts as the principal in the transaction. Accordingly, we report revenues on a gross basis.

We also use sales agents that assist in the sales process with certain customers primarily located in the Latin America and Asia-Pacific regions. Sales agents are not resellers. If a sales agent is engaged in the sales process, we receive the order directly from and sell the products and services directly to the end customer, and we pay a commission to the sales agent, calculated as a percentage of the related transaction value. Accounting considerations related to sales agent commissions are discussed in the “Costs to Obtain or Fulfill a Contract” section below.

Costs to Obtain or Fulfill a Contract

We capitalize commission expenses paid to internal sales personnel and sales agent commissions that are incremental to obtaining customer contracts, for which we recognize the related revenue over a future period greater than 12 months. We incur these costs on initial sales of product, professional services and maintenance and support contract renewals. We defer these costs and amortize them over the period of benefit, which we generally consider to be the contract term or length of the longest delivery period as contract capitalization costs in the consolidated balance sheets. We defer these costs and amortize them over the period of benefit, which we generally consider to be the contract term. We elected to use the practical expedient, allowing us to recognize the incremental costs of obtaining a contract as an expense when incurred if the amortization period would have been one year or less.

Commissions paid relating to maintenance and support contract renewals of twelve months or less are expensed as incurred as commissions paid on renewals are commensurate with commissions paid on initial sales transactions. Costs to obtain a contract for professional services contracts are expensed as incurred in accordance with the practical expedient as the contractual period of our professional services contracts are one year or less. We periodically review the carrying amount of capitalized contract costs to determine whether events or changes in circumstances have occurred that could impact the period of benefit.

Deferred Revenue

We record amounts billed in excess of revenue recognized as deferred revenue. Deferred revenue includes customer deposits, amounts billed for maintenance and support services contracts in advance of services being performed, amounts for trade-in right liabilities and amounts related to contracts that have been deferred as a result of not meeting the required revenue recognition criteria as of the end of the reporting period. We report deferred revenue expected to be recognized as revenue more than one year subsequent to the balance sheet date within long-term liabilities in the consolidated balance sheets.

We defer recognition of direct costs, such as cost of goods and services, until recognition of the related revenue. We classify such costs as current assets if the related deferred revenue is classified as current and as non-current assets if the related deferred revenue is classified as non-current.

Other Revenue Recognition Policies

Our customary payment terms are generally 90 days or less. We have elected to apply the practical expedient that allows an entity to not adjust the promised amount of consideration in customer contracts for the effect of a significant financing component when the period between the transfer of product and services and payment of the related consideration is less than one year. If we provide extended payment terms that represent a significant financing component, we adjust the amount of promised consideration for the time value of money using an appropriate discount rate and recognize interest income separate from the revenue recognized on contracts with customers. During the years ended December 31, 2020 and 2019, we recorded \$0.1 million and \$0.2 million, respectively, in interest income in our consolidated statements of operations and comprehensive income (loss) related to customers that were determined to have a significant financing component.

In limited instances, we have offered future rebates to customers based on a fixed or variable percentage of actual sales volumes over specified periods. The future rebates earned based on the customer’s purchasing from us in one period may be used as credits to be applied by them against accounts receivable due to the Company in later periods. We account for these future rebates as variable consideration and reduce the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will occur when the variable consideration is resolved. We estimate the reduction of the transaction price based on historical activity and other relevant factors and recognize it when we recognize revenue for the transfer of goods and services to the customer on which the future rebate was earned. Other forms of contingent revenue or variable consideration are infrequent.

We exclude any taxes assessed by a governmental authority that are directly imposed on a revenue-producing transaction (e.g., sales, use and value added taxes) from our transaction price.

We record billings to customers for reimbursement of out-of-pocket expenses, including travel, lodging and meals as revenue, and we record the associated costs incurred by us for those items as cost of revenue. We account for revenue related to the reimbursement of out-of-pocket costs as variable consideration.

We account for any shipping and handling activities as a fulfillment cost rather than an additional promised service. We record shipping and handling billed to customers as an offset to cost of revenue.

Inventories

We value inventories the lower of cost or market value. We compute cost using the first-in first-out convention. Inventories are composed of hardware and related component parts of finished goods. We establish provisions for excess and obsolete inventories after evaluating historical sales, future demand, market conditions, expected product life cycles, and current inventory levels to reduce such inventories to their estimated net realizable value. We make such provisions in the normal course of business and charge them to cost of revenue in our consolidated statements of operations and comprehensive income (loss).

We include deferred inventory costs within inventory in our consolidated balance sheets. Deferred inventory costs represent the cost of products that have been delivered to the customer for which revenue associated with the arrangement has been deferred as a result of not meeting all of the required revenue recognition criteria, such as receipt of customer acceptance. Until the revenue recognition criteria are met, we retain the right to return of the underlying inventory. We recognize deferred inventory costs as cost of revenue in our consolidated statements of operations and comprehensive income (loss) when the related revenue is recognized.

Goodwill and Intangible Assets

Goodwill represents the excess purchase price over the estimated fair value of net assets acquired as of the acquisition date. We test goodwill for impairment on an annual basis and between annual tests when impairment indicators are identified, and goodwill is written down when impaired. We recognized goodwill in connection with the acquisition of NetComm on July 1, 2019.

We perform our annual goodwill impairment test during the fourth quarter. For our annual goodwill impairment test, we operate under one reporting unit and the fair value of our reporting unit has been determined based on our enterprise value. As part of the annual goodwill impairment test, we have the option to perform a qualitative assessment to determine whether further impairment testing is necessary. Examples of events and circumstances that might indicate that the reporting unit's fair value is less than its carrying amount include macro-economic conditions such as deterioration in the entity's operating environment or industry or market considerations; entity-specific events such as increasing costs, declining financial performance, or loss of key personnel; or other events such as a sustained decrease in the stock price on either an absolute basis or relative to peers. If, as a result of our qualitative assessment, we determine that it is more likely than not (i.e., greater than 50% chance) that the fair value of our reporting unit is less than our carrying amount, the quantitative impairment test will be required. Otherwise, no further testing will be required. We completed our qualitative assessment and concluded that as of December 31, 2020, it is not more likely than not that the fair value of our reporting unit is less than our carrying amount.

We amortize our acquired intangible assets subject to amortization using the straight-line method over their estimated useful lives, ranging from 3 to 10 years. Purchased software licenses are classified as intangible assets and are amortized using the straight-line method over their estimated useful lives, typically ranging from 3 to 4 years. We evaluate the recoverability of intangible assets periodically, by taking into account events or circumstances that may warrant revised estimates of useful lives or that indicate the asset may be impaired. We considered potential impairment indicators of acquired intangible assets at December 31, 2020 and noted no indicators of impairment.

Product Warranties

Substantially all of our products are covered by a warranty for software and hardware for periods ranging from 90 days to one year. In addition, in conjunction with customers' renewals of maintenance and support contracts, we offer an extended warranty for periods typically of one to three years for agreed-upon fees. In the event of a failure of a hardware product or software covered by these warranties, we must repair or replace the software or hardware or, if those remedies are insufficient, provide a refund at our discretion. Our warranty reserve, which is included in accrued expenses and other current liabilities in our consolidated balance sheets, reflects estimated material, labor and other costs related to potential or actual software and hardware warranty claims for which we expect to incur an obligation. We base our estimates of anticipated rates of warranty claims and the costs associated therewith are primarily on historical information and future forecasts. We

periodically assess the adequacy of the warranty reserve and adjust the amount as necessary. If the historical data used to calculate the adequacy of the warranty reserve are not indicative of future requirements, additional or reduced warranty reserves may be required.

Income Taxes

We account for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement and tax basis of assets and liabilities, as measured by enacted tax rates anticipated to be in effect when these differences reverse. This method also requires the recognition of future tax benefits to the extent that realization of such benefits is more likely than not. Deferred tax expense or benefit is the result of changes in the deferred tax assets and liabilities. We assess the likelihood that our deferred tax assets will be recovered from future taxable income and, to the extent we believe, based upon the weight of available evidence, that it is more likely than not that all or a portion of the deferred tax assets will not be realized, we establish a valuation allowance through a charge to income tax expense. We evaluate the potential for recovery of deferred tax assets by estimating the future taxable profits expected and considering prudent and feasible tax planning strategies. As of December 31, 2019, we determined that it was more likely than not that a portion of our net U.S. deferred tax assets would not be realized, and thus recorded a valuation allowance against our net deferred tax assets. As of December 31, 2020, we maintain a valuation allowance of \$24.5 million against our net U.S. deferred tax assets that are not expected to be realized, a decrease of \$14.7 million during the year ended December 31, 2020 (see Note 10).

We record a liability for potential payments of taxes to various tax authorities related to uncertain tax positions and other tax matters. We base the recorded liability on a determination of whether and how much of a tax benefit in our tax filings or positions is more likely than not to be realized. The amount of the benefit that may be recognized in the financial statements is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. To the extent that the assessment of such tax positions changes, we record the change in estimate in the period in which the determination is made. We establish a liability, which is included in long term accrued income taxes in our consolidated balance sheets, for tax-related uncertainties based on estimates of whether, and the extent to which, additional taxes will be due. These liabilities are established when we believe that certain positions might be challenged despite our belief that the tax return positions are fully supportable. We adjust the recorded liability in light of changing facts and circumstances. Our provision for income taxes includes the impact of the recorded liability and changes thereto.

We recognize interest and penalties related to uncertain tax positions within other income (expense) in our consolidated statements of operations and comprehensive income. We include accrued interest and penalties in long term accrued income taxes in our consolidated balance sheets.

For taxable years beginning after January 1, 2018, taxpayers are subjected to the GILTI provisions. The GILTI provisions require us to currently recognize in U.S. taxable income a deemed dividend inclusion of foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary's tangible assets. The ability to benefit from a deduction and foreign tax credits against a portion of the GILTI income may be limited under the GILTI rules as a result of the utilization of net operating losses, foreign sourced income, and other potential limitations within the foreign tax credit calculation. During the years ended December 31, 2020 and 2019, we recorded an income tax charge of \$3.5 million and \$0.9 million, respectively, related to GILTI. We have made an accounting policy election, as allowed by the SEC and FASB, to recognize the impacts of GILTI within the period incurred. Therefore, no U.S. deferred taxes are provided on GILTI inclusions of future foreign subsidiary earnings.

Stock-Based Compensation

We measure stock options and other stock-based awards granted to employees and directors based on the fair value on the date of the grant and recognize compensation expense of those awards, net of estimated forfeitures, over the requisite service period, which is generally the vesting period of the respective award. Generally, we issue stock options with only service-based vesting conditions and record the expense for these awards using the straight-line method.

We classify stock-based compensation expense in our consolidated statements of operations and comprehensive income (loss) in the same manner in which the award recipient's payroll costs are classified or in which the award recipient's service payments are classified.

We recognize compensation expense for only the portion of awards that are expected to vest. In developing a forfeiture rate estimate, we have considered our historical experience to estimate pre-vesting forfeitures for service-based awards. The impact of a forfeiture rate adjustment will be recognized in full in the period of adjustment, and if the actual forfeiture rate is

materially different from our estimate, we may be required to record adjustments to stock-based compensation expense in future periods.

We estimate the fair value of each stock option grant on the date of grant using the Black-Scholes option pricing model. We were a private company until December 14, 2017 and lack sufficient company-specific historical and implied volatility information for our stock. Therefore, we estimate our expected stock volatility based on the historical volatility of publicly traded peer companies and expect to continue to do so until such time as we have adequate historical data regarding the volatility of our own traded stock price. The expected term of our stock options has been determined utilizing the “simplified” method for awards that qualify as “plain-vanilla” options. The expected term of stock options granted to non-employees is equal to the contractual term of the option award. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that we do not have a history of declaring or paying cash dividends, except for the special cash dividends declared in November 2014, June 2016, December 2016, May 2017 and November 2017 and in those circumstances the board of directors approved cash dividends to be paid to holders of our stock options, stock appreciation rights and restricted stock units upon vesting as an equitable adjustment to the holders of such instruments.

We have also granted SARs to certain employees, which require us to pay in cash upon exercise an amount equal to the product of the excess of the per share fair market value of our common stock on the date of exercise over the exercise price, multiplied by the number of shares of common stock with respect to which the SAR is exercised. Because these awards may require us to settle the awards in cash, we account for them as a liability in our consolidated balance sheets. We recognize the liability related to these awards, as well as related compensation expense over the period during which services are rendered until completed. We estimate changes in the fair value of the SAR liability using the Black-Scholes option pricing model and record them in our consolidated statements of operations and comprehensive income (loss). After vesting is completed, we will continue to remeasure the fair market value of the liability until the award is either exercised or canceled, with changes in the fair value of the liability recorded in our consolidated statements of operations and comprehensive income (loss).

Emerging Growth Company Status

The Jumpstart Our Business Startups Act of 2012, or the JOBS Act, provides that an “emerging growth company” can take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. However, we have elected not to “opt out” of such extended transition period, which means that when a standard is issued or revised and it has different application dates for public or private companies, we will adopt the new or revised standard at the time private companies adopt the new or revised standard, provided that we continue to be an emerging growth company. The JOBS Act provides that our decision to take advantage of the extended transition period for complying with new or revised accounting standards is irrevocable.

Off-Balance Sheet Arrangements

As of December 31, 2020, 2019 and 2018, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K, such as the use of unconsolidated subsidiaries, structured finance, special purpose entities or variable interest entities.

Recent Accounting Pronouncements

Refer to the “Summary of Significant Accounting Policies” footnote within our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for our analysis of recent accounting pronouncements that are applicable to our business.

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

Market risk is the risk of loss to future earnings, values or cash flows that may result from changes in the price of a financial instrument. The value of a financial instrument may change as a result of changes in interest rates, exchange rates, commodity prices, equity prices and other market changes. We are exposed to market risk related to changes in foreign currency exchange rates and interest rates. We do not use derivative financial instruments for speculative or trading purposes. However, we have entered into, and in the future expect to continue to enter into, exchange rate hedging arrangements to manage certain of the risks described below.

Foreign Currency Exchange Risk

We have accounts receivables denominated in foreign currencies, and our operations outside of the United States incur their operating expenses in foreign currencies. To date, the majority of our product sales and inventory purchases have been denominated in U.S. dollars. For our subsidiaries in Ireland and Australia, the U.S. dollar is the functional currency. For each of our other foreign subsidiaries, the functional currency is the local currency. During the years ended December 31, 2020, 2019 and 2018, we incurred foreign currency transaction gains (losses) of \$0.5 million, \$0.3 million and \$(0.9) million, respectively, primarily related to unrealized and realized foreign currency gains for accounts receivable denominated in foreign currencies and operating expenses that are denominated in local currencies. We recorded these foreign currency transaction losses as a component of other income (expense), net in our consolidated statements of operations and comprehensive income (loss). We believe that a 10% change in the exchange rate between either the U.S. dollar and Euro or the U.S. dollar and Australian dollar would not materially impact our operating results or financial position.

Our foreign currency risk management practices are principally intended to mitigate the potential financial impact of changes in the value of transactions and balances denominated in foreign currencies resulting from changes in foreign currency exchange rates. From time to time we enter into cash flow hedges, which utilize foreign currency forward contracts to hedge specific forecasted transactions of our foreign subsidiaries with the goal of protecting our budgeted revenues and expenses against foreign currency exchange rate changes compared to our budgeted rates. During the year ended December 31, 2020, we settled two cash flow hedges which we used to hedge specific operating cash flows denominated in Australian dollars. No cash flow hedges were outstanding as of December 31, 2020.

The success of our foreign currency risk management depends upon forecasts of transaction activity denominated in various currencies. To the extent that these forecasts are overstated or understated during periods of currency volatility, we could experience unanticipated foreign currency gains or losses that could have a material impact on our results of operations. Furthermore, our failure to identify new exposures and hedge them in an effective manner may result in material foreign currency gains or losses.

Interest Rate Sensitivity

Our cash and cash equivalents as of December 31, 2020 consisted of cash maintained in FDIC-insured operating accounts as well as investments in money market mutual funds and certificates of deposit. We also have policies requiring us to invest in high-quality issuers, limit our exposure to any individual issuer, and ensure adequate liquidity. Our primary exposure to market risk for our cash and cash equivalents is interest income sensitivity, which is primarily affected by changes in the general level of U.S. interest rates. However, we do not believe a sudden change in the interest rates for our cash and cash equivalents would have a material impact on our financial condition, results of operations or cash flows.

We have a credit agreement that provides us with a term loan facility of \$300.0 million and a revolving credit facility of up to \$25.0 million in revolving credit loans and letters of credit. Borrowings under the facilities bear interest at a floating rate, which can be either a Eurodollar rate plus an applicable margin or, at our option, a base rate (defined as the highest of (x) the JPMorgan Chase, N.A. prime rate, (y) the federal funds effective rate, plus one-half percent (0.50%) per annum and (z) a one-month Eurodollar rate plus 1.00% per annum) plus an applicable margin. The applicable margin for borrowings under the term loan facility is 4.00% per annum for Eurodollar rate loans (subject to a 1.00% per annum interest rate floor) and 3.00% per annum for base rate loans. The applicable margin for borrowings under the revolving credit facility is 1.75% per annum for Eurodollar rate loans and 0.75% per annum for base rate loans, subject to reduction based on our maintaining of specified net leverage ratios.

As of December 31, 2020, we had borrowings of \$288.0 million outstanding under the term loan facility, bearing interest at a rate of 5.00% per annum, which was based on a six-month Eurodollar rate at the applicable floor of 1.00% per annum plus the applicable margin of 4.00% per annum for Eurodollar rate loans. Changes in interest rates could cause interest charges on our term loan facility to fluctuate. Based on the amount of borrowings outstanding as of December 31, 2020, an increase of 10% in the six-month Eurodollar rate as of December 31, 2020 would cause pre-tax decreases to our earnings and cash flows of approximately \$0.3 million per year, assuming that such rate were to remain in effect for a year. A decrease in the six-month Eurodollar rate as of December 31, 2020 would have no impact on our earnings and cash flows, as the interest rate in effect at December 31, 2020 on the term loan facility was at the applicable floor of 1.00% per annum.

On July 1, 2020, we drew down on our revolving credit facility under our term loan agreement in the amount of \$6.5 million. As noted in Note 11, Debt, borrowings under the revolving credit facility mature on December 21, 2021 and the applicable margin for borrowings under the revolving credit facility is 1.75% per annum for Eurodollar rate loans. The interest rate on the outstanding borrowings as of December 31, 2020, was 2.12%, which was based on a six-month Eurodollar rate of 0.37% per annum plus the applicable margin of 1.75% per annum for Eurodollar rate loans. An increase of 10% in the six-month Eurodollar rate would result in a pre-tax decrease to our earnings and cash flows of less than \$0.1 million per year, assuming that such rate was to remain in effect for a year. A decrease of 10% in the six-month Eurodollar rate would result in a pre-tax increase to our earnings and cash flows of less than \$0.1 million per year, assuming that such rate was to remain in effect for a year.

Inflation Risk

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

Item 8. Financial Statements and Supplementary Data.

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To the Stockholders and the Board of Directors of Casa Systems, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Casa Systems, Inc. (the Company) as of December 31, 2020, and the related consolidated statements of operations and comprehensive income, stockholders' equity and cash flows for the year then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020, and the results of its operations and its cash flows for the year then ended, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our 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 financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, and audit of its internal control over financial reporting. As part of our audit we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audit included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error fraud, and performing procedures that respond to those risks. Such procedures including examining, on a test basis, evidence regarding the amounts and disclosures in the 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 financial statements. We believe that our audit provides a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2020.

Boston, Massachusetts
February 25, 2021

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Casa Systems, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Casa Systems, Inc. and its subsidiaries (the “Company”) as of December 31, 2019, and the related consolidated statements of operations and comprehensive income (loss), of stockholders' equity and of cash flows for each of the two years in the period ended December 31, 2019, including the related notes (collectively referred to as 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 each of the two years in the period ended December 31, 2019 in conformity with accounting principles generally accepted in the United States of America.

Change in Accounting Principles

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenue from contracts with customers in 2019.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s 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 of these consolidated financial statements in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

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/ PricewaterhouseCoopers LLP
Boston, Massachusetts

February 27, 2020, except for the presentation of disaggregated revenue discussed in Note 15, as to which the date is February 25, 2021

We served as the Company’s auditor from 2014 to 2020.

CASA SYSTEMS, INC.
CONSOLIDATED BALANCE SHEETS
(Amounts in thousands, except per share amounts)

	December 31,	
	2020	2019
Assets		
Current assets:		
Cash and cash equivalents	\$ 157,455	\$ 113,638
Accounts receivable, net of provision for doubtful accounts of \$58 and \$20 as of December 31, 2020 and 2019, respectively	94,124	93,100
Inventory	101,204	93,604
Prepaid expenses and other current assets	3,864	4,884
Prepaid income taxes	14,087	3,217
Total current assets	370,734	308,443
Property and equipment, net	28,880	35,910
Accounts receivable, net of current portion	143	575
Deferred tax assets	1,150	69
Goodwill	50,177	50,347
Intangible assets, net	35,844	41,148
Other assets	6,038	7,820
Total assets	<u>\$ 492,966</u>	<u>\$ 444,312</u>
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 41,203	\$ 25,890
Accrued expenses and other current liabilities	39,793	34,567
Accrued income taxes	7,463	—
Deferred revenue	15,531	25,485
Current portion of long-term debt, net of unamortized debt issuance costs	15,171	8,524
Total current liabilities	119,161	94,466
Accrued income taxes, net of current portion	9,520	12,381
Deferred tax liabilities	7,282	8,993
Deferred revenue, net of current portion	3,520	4,583
Long-term debt, net of current portion and unamortized debt issuance costs	276,085	284,756
Other non-current liabilities	1,024	569
Total liabilities	<u>416,592</u>	<u>405,748</u>
Commitments and contingencies (Note 18)		
Stockholders' equity:		
Preferred stock, \$0.001 par value; 5,000 shares authorized; no shares issued and outstanding	—	—
Common stock, \$0.001 par value; 500,000 shares authorized; 85,329 and 84,333 shares issued as of December 31, 2020 and 2019, respectively; 83,607 and 83,838 shares outstanding as of December 31, 2020 and 2019, respectively	85	84
Treasury stock, at cost; 1,722 and 495 shares at December 31, 2020 and 2019, respectively	(4,826)	(1,795)
Additional paid-in capital	183,041	169,561
Accumulated other comprehensive income (loss)	337	(2,222)
Accumulated deficit	(102,263)	(127,064)
Total stockholders' equity	<u>76,374</u>	<u>38,564</u>
Total liabilities and stockholders' equity	<u>\$ 492,966</u>	<u>\$ 444,312</u>

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

CASA SYSTEMS, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
(Amounts in thousands, except per share amounts)

	Year Ended December 31,		
	2020	2019	2018
Revenue:			
Product	\$ 346,083	\$ 241,377	\$ 256,989
Service	47,163	40,920	40,138
Total revenue	<u>393,246</u>	<u>282,297</u>	<u>297,127</u>
Cost of revenue:			
Product	187,706	113,059	74,350
Service	4,941	6,706	4,811
Total cost of revenue	<u>192,647</u>	<u>119,765</u>	<u>79,161</u>
Gross profit	<u>200,599</u>	<u>162,532</u>	<u>217,966</u>
Operating expenses:			
Research and development	84,370	83,331	70,974
Selling, general and administrative	92,016	88,320	68,026
Total operating expenses	<u>176,386</u>	<u>171,651</u>	<u>139,000</u>
Income (loss) from operations	<u>24,213</u>	<u>(9,119)</u>	<u>78,966</u>
Other income (expense):			
Interest income	999	4,406	6,259
Interest expense	(16,895)	(20,522)	(19,763)
Gain (loss) on foreign currency, net	452	298	(911)
Other income, net	980	522	1,387
Total other income (expense), net	<u>(14,464)</u>	<u>(15,296)</u>	<u>(13,028)</u>
Income (loss) before (benefit from) provision for income taxes	9,749	(24,415)	65,938
(Benefit from) provision for income taxes	<u>(15,052)</u>	<u>23,791</u>	<u>(7,068)</u>
Net income (loss)	<u>24,801</u>	<u>(48,206)</u>	<u>73,006</u>
Other comprehensive income (loss) —foreign currency translation adjustment, net of tax	2,559	(1,064)	(1,352)
Comprehensive income (loss)	<u>\$ 27,360</u>	<u>\$ (49,270)</u>	<u>\$ 71,654</u>
Net income (loss) attributable to common stockholders:			
Basic and diluted	<u>\$ 24,801</u>	<u>\$ (48,206)</u>	<u>\$ 73,006</u>
Net income (loss) per share attributable to common stockholders:			
Basic	<u>\$ 0.30</u>	<u>\$ (0.57)</u>	<u>\$ 0.87</u>
Diluted	<u>\$ 0.29</u>	<u>\$ (0.57)</u>	<u>\$ 0.79</u>
Weighted-average number of shares used to compute net income (loss) per share attributable to common stockholders:			
Basic	<u>83,465</u>	<u>83,853</u>	<u>83,539</u>
Diluted	<u>85,278</u>	<u>83,853</u>	<u>91,877</u>

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

CASA SYSTEMS, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Amounts in thousands, except per share amounts)

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount	Shares	Amount				
Balances at December 31, 2017	81,043	\$ 81	—	\$ —	\$ 128,798	\$ 194	\$ (78,917)	\$ 50,156
Exercise of stock options and common stock issued upon vesting of equity awards, net of shares withheld for employee taxes	7,090	7	—	—	14,709	—	—	14,716
Foreign currency translation adjustment, net of tax of \$(343)	—	—	—	—	—	(1,352)	—	(1,352)
Follow-on offering selling stockholders profit disgorgement, net of offering costs of \$41	—	—	—	—	3,770	—	—	3,770
Stock repurchase program	(5,172)	(5)	—	—	—	—	(75,097)	(75,102)
Stock-based compensation	—	—	—	—	9,662	—	—	9,662
Net income	—	—	—	—	—	—	73,006	73,006
Balances at December 31, 2018	82,961	83	—	—	156,939	(1,158)	(81,008)	74,856
Exercise of stock options and common stock issued upon vesting of equity awards, net of shares withheld for employee taxes	1,372	1	—	—	1,678	—	—	1,679
Foreign currency translation adjustment, net of tax of \$261	—	—	—	—	—	(1,064)	—	(1,064)
Effect of adopted accounting standards	—	—	—	—	—	—	2,150	2,150
Repurchases of treasury shares	—	—	495	(1,795)	—	—	—	(1,795)
Stock-based compensation	—	—	—	—	10,944	—	—	10,944
Net loss	—	—	—	—	—	—	(48,206)	(48,206)
Balances at December 31, 2019	84,333	84	495	(1,795)	169,561	(2,222)	(127,064)	38,564
Exercise of stock options and common stock issued upon vesting of equity awards, net of shares withheld for employee taxes	996	1	—	—	554	—	—	555
Foreign currency translation adjustment, net of tax of (\$49)	—	—	—	—	—	2,559	—	2,559
Repurchases of treasury shares	—	—	1,227	(3,031)	—	—	—	(3,031)
Stock-based compensation	—	—	—	—	12,926	—	—	12,926
Net income	—	—	—	—	—	—	24,801	24,801
Balances at December 31, 2020	<u>85,329</u>	<u>\$ 85</u>	<u>1,722</u>	<u>\$ (4,826)</u>	<u>\$ 183,041</u>	<u>\$ 337</u>	<u>\$ (102,263)</u>	<u>\$ 76,374</u>

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

CASA SYSTEMS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Amounts in thousands)

	Year Ended December 31,		
	2020	2019	2018
Cash flows from operating activities:			
Net income (loss)	\$ 24,801	\$ (48,206)	\$ 73,006
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	17,970	14,722	9,454
Stock-based compensation	13,155	9,821	8,894
Deferred income taxes	(2,526)	19,641	(11,517)
Change in provision for excess and obsolete inventory	1,616	545	(5,883)
Increase (decrease) in provision for doubtful accounts	38	560	(282)
Gain on disposal of assets	115	—	—
Changes in operating assets and liabilities:			
Accounts receivable	(350)	1,881	34,716
Inventory	(9,774)	(21,276)	(11,051)
Prepaid expenses and other assets	2,837	(3,679)	(1,084)
Prepaid income taxes	(11,745)	16	146
Accounts payable	17,015	1,554	4,197
Accrued expenses and other current liabilities	6,254	(7,827)	6,124
Accrued income taxes	5,297	2,724	(3,088)
Deferred revenue	(11,061)	(9,498)	(5,087)
Net cash provided by (used in) operating activities	<u>53,642</u>	<u>(39,022)</u>	<u>98,545</u>
Cash flows used in investing activities:			
Purchases of property and equipment	(5,153)	(8,591)	(7,966)
Purchases of intangible assets	(432)	—	—
Acquisition of a business, net of cash acquired	—	(109,431)	—
Net cash used in investing activities	<u>(5,585)</u>	<u>(118,022)</u>	<u>(7,966)</u>
Cash flows used in financing activities:			
Principal repayments of debt	(9,644)	(6,820)	(3,304)
Drawdowns on revolving credit facility	6,500	—	—
Proceeds from exercise of stock options	1,195	2,687	14,730
Payments of dividends and equitable adjustments	(683)	(2,590)	(7,325)
Follow-on offering selling stockholders profit disgorgement	—	—	3,811
Repurchases of common stock	(3,031)	(1,795)	(75,102)
Payments of initial public offering costs	—	—	(1,148)
Employee taxes paid related to net share settlement of equity awards	(640)	(1,009)	(13)
Net cash used in financing activities	<u>(6,303)</u>	<u>(9,527)</u>	<u>(68,351)</u>
Effect of exchange rate changes on cash and cash equivalents	2,050	(378)	(1,442)
Net increase (decrease) in cash, cash equivalents and restricted cash	43,804	(166,949)	20,786
Cash, cash equivalents and restricted cash at beginning of year	114,657	281,606	260,820
Cash, cash equivalents and restricted cash at end of year (1)	<u>\$ 158,461</u>	<u>\$ 114,657</u>	<u>\$ 281,606</u>
Supplemental disclosures of cash flow information:			
Cash paid for interest	\$ 12,917	\$ 18,885	\$ 18,348
Cash paid for income taxes	\$ 2,969	\$ 4,334	\$ 7,268
Supplemental disclosures of non-cash investing and financing activities:			
Purchases of property and equipment included in accounts payable	\$ 128	\$ 727	\$ 1,255
Unpaid dividends and equitable adjustments included in accrued expenses and other current liabilities	\$ 63	\$ 731	\$ 3,336
Release of customer incentives included in accounts receivable and accrued expenses and other current liabilities	\$ 157	\$ 5,735	\$ 8,556

(1) See Note 2 of the accompanying notes for a reconciliation of the ending balance of cash, cash equivalents and restricted cash shown in these consolidated statements of cash flows.

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

CASA SYSTEMS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(Amounts in thousands, except per share amounts)

1. Nature of Business and Basis of Presentation

Casa Systems, Inc. (the “Company”) was incorporated under the laws of the State of Delaware on February 28, 2003. The Company is a global communications technology company headquartered in Andover, Massachusetts and has wholly owned subsidiaries in China, France, Canada, Ireland, Spain, Colombia, the Netherlands, Hong Kong, Australia, Germany, the United Kingdom and New Zealand.

The Company offers physical, virtual and cloud-native 5G infrastructure and customer premise networking equipment for public and private high-speed data and multi-service communications networks. The Company’s core and edge convergence technology enables communications service providers and enterprises to cost-effectively and dynamically increase network speed, add bandwidth capacity and new services, reduce network complexity and reduce operating and capital expenditures.

The Company is subject to a number of risks similar to other companies of comparable size and other companies selling and providing services to the communications industry. These risks include, but are not limited to, the level of capital spending by the communications industry, a lengthy sales cycle, dependence on the development of new products and services, unfavorable economic and market conditions, competition from larger and more established companies, limited management resources, dependence on a limited number of contract manufacturers and suppliers, the rapidly changing nature of the technology used by the communications industry and reliance on resellers and sales agents. Failure by the Company to anticipate or to respond adequately to technological developments in its industry, changes in customer or supplier requirements, changes in regulatory requirements or industry standards, or any significant delays in the development or introduction of products could have a material adverse effect on the Company’s operating results, financial condition and cash flows.

The Company is an “emerging growth company,” as defined in the Jumpstart Our Business Startups Act of 2012 (the “JOBS Act”), and may remain an emerging growth company until the last day of the fiscal year following the fifth anniversary of the initial public offering, subject to specified conditions. The JOBS Act provides that an emerging growth company can take advantage of the extended transition period afforded by the JOBS Act for the implementation of new or revised accounting standards. The Company has elected not to “opt out” of such extended transition period, which means that when a standard is issued or revised and it has different application dates for public or private companies, the Company will adopt the new or revised standard at the time private companies adopt the new or revised standard, provided that the Company continues to be an emerging growth company. The JOBS Act provides that the decision to take advantage of the extended transition period for complying with new or revised accounting standards is irrevocable.

The accompanying consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“GAAP”) and include the accounts and results of operations of the Company and its wholly owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosures of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting periods.

Significant estimates and judgments relied upon by management in preparing these consolidated financial statements include revenue recognition, provision for doubtful accounts, reserves for excess and obsolete inventory, valuation of inventory and deferred inventory costs, the expensing and capitalization of software-related research and development costs, amortization and depreciation periods, the recoverability of net deferred tax assets, valuations of uncertain tax positions, warranty allowances, the valuation of equity instruments and stock-based compensation expense.

Although the Company regularly reassesses the assumptions underlying these estimates, actual results could differ materially from these estimates. Changes in estimates are recorded in the period in which they become known. The Company

bases its estimates on historical experience and various other assumptions that it believes to be reasonable under the circumstances existing at the time such estimates are made.

The emergence of COVID-19 around the world, and particularly in the United States and China, presents various risks to the Company, not all of which the Company is able to fully evaluate or even to foresee at the current time, and could have a material effect upon the estimates and judgments relied upon by management in preparing these consolidated financial statements. While the COVID-19 pandemic did not significantly adversely affect the Company's financial results and business operations in the year ended December 31, 2020, economic and health conditions in the United States and across most of the globe changed rapidly during the year, and are continuing to change after the end of the year. Globally, all aspects of the Company's business remain fully operational. However, increasing demand for certain of the Company's products has increased pressure on its supply chain which could impact continued availability of inventory requirements. The Company will continue to monitor its business very closely for any effects of COVID-19 for as long as necessary on an ongoing basis.

Subsequent Event Considerations

The Company considers events or transactions that occur after the balance sheet date but prior to the issuance of the financial statements to provide additional evidence for certain estimates or to identify matters that require additional disclosure. Subsequent events have been evaluated as required. The Company has evaluated all subsequent events and determined that there are no material recognized or unrecognized subsequent events requiring disclosure in these consolidated financial statements.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents include all highly liquid investments maturing within three months from the date of purchase. As of December 31, 2020 and 2019, the Company's cash and cash equivalents consisted of investments in certificates of deposit and money market mutual funds.

Restricted cash, which was included in other assets as of December 31, 2020 and 2019, consisted of a certificate of deposit of \$1,006 and \$1,019, respectively, in each period pledged as collateral for a stand-by letter of credit required to support a contractual obligation.

The following table is a reconciliation of cash, cash equivalents and restricted cash included in the accompanying consolidated balance sheets that sum to the total cash, cash equivalents and restricted cash included in the accompanying consolidated statements of cash flows.

	<u>December 31, 2020</u>	<u>December 31, 2019</u>
Cash and cash equivalents	\$ 157,455	\$ 113,638
Restricted cash included in other assets	1,006	1,019
	<u>\$ 158,461</u>	<u>\$ 114,657</u>

Accounts Receivable

Accounts receivable are presented net of a provision for doubtful accounts, which is an estimate of amounts that may not be collectible. Accounts receivable for arrangements with customary payment terms, which are one year or less, are recorded at invoiced amounts and do not bear interest. The Company generally does not require collateral, but may, in certain instances based on its credit assessment, require full or partial prepayment prior to shipment. The Company may, in limited circumstances, grant payment terms longer than one year. Payments due beyond 12 months from the balance sheet date are recorded as non-current assets.

Accounts receivable as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Current portion of accounts receivable, net:		
Accounts receivable, net	\$ 93,480	\$ 91,273
Accounts receivable, extended payment arrangements	644	1,827
	<u>94,124</u>	<u>93,100</u>
Accounts receivable, net of current portion:		
Accounts receivable, extended payment arrangements	143	575
	<u>\$ 94,267</u>	<u>\$ 93,675</u>

The Company performs ongoing credit evaluations of its customers and, if necessary, provides a provision for doubtful accounts and expected losses. When assessing and recording its provision for doubtful accounts, the Company evaluates the age of its accounts receivable, current economic trends, creditworthiness of customers, customer payment history, and other specific customer and transaction information. The Company writes off accounts receivable against the provision when it determines a balance is uncollectible and no longer actively pursues collection of the receivable. Adjustments to the provision for doubtful accounts are recorded as selling, general and administrative expenses in the consolidated statements of operations and comprehensive income (loss). A summary of changes in the provision for doubtful accounts for the years ended December 31, 2020, 2019 and 2018 is as follows:

	Year Ended December 31,		
	2020	2019	2018
Provision for doubtful accounts at beginning of year	\$ 20	\$ 410	\$ 692
Provisions and recoveries	38	560	—
Write-offs	—	(950)	(282)
Provision for doubtful accounts at end of year	<u>\$ 58</u>	<u>\$ 20</u>	<u>\$ 410</u>

As of December 31, 2020 and 2019, the Company concluded that all amounts due under extended payment term arrangements were collectible and no reserve for credit losses was recorded. During the years ended December 31, 2020, 2019 and 2018, the Company did not provide a reserve for credit losses and did not write off any uncollectible receivables due under extended payment term arrangements.

Inventories

The Company values inventories at the lower of cost or market value. The Company computes cost using the first-in first-out convention. Inventories are composed of hardware and related component parts of finished goods. The Company establishes provisions for excess and obsolete inventories after evaluating historical sales, future demand, market conditions, expected product life cycles, and current inventory levels to reduce such inventories to their estimated net realizable value. The Company makes such provisions in the normal course of business and charges them to cost of revenue in its consolidated statements of operations and comprehensive income (loss).

The Company includes deferred inventory costs within inventory in its consolidated balance sheets. Deferred inventory costs represent the cost of products that have been delivered to the customer for which revenue associated with the arrangement has been deferred as a result of not meeting all of the required revenue recognition criteria, such as receipt of customer acceptance. The Company recognizes deferred inventory costs as cost of revenue in its consolidated statements of operations and comprehensive income (loss) when the related revenue is recognized.

Property and Equipment

The Company states property and equipment at historical cost less accumulated depreciation. The Company computes depreciation using the straight-line method over the estimated useful lives of the assets. The Company records leasehold improvements at cost with any reimbursement from the landlord being accounted for as deferred rent, which is amortized using the straight-line method over the lease term. The Company also includes costs for trial systems held and used by its customers pursuant to evaluation agreements within property and equipment. The Company depreciates trial systems held and used by its customers over the estimated useful life of such assets, which is two years.

Whenever a trial system is sold to a customer and the selling price is recorded as revenue, the Company removes the related net book value of the trial system sold from property and equipment and records it as a cost of revenue. The Company expenses maintenance and repairs expenditures as incurred.

Estimated useful lives of the respective property and equipment assets are as follows:

	Estimated Useful Life
Computers and purchased software	3 – 4 years
Leasehold improvements	Shorter of lease term or 7 years
Furniture and fixtures	6 – 8 years
Machinery and equipment	3 – 5 years
Building	40 years
Building improvements	5 – 40 years
Trial systems at customers' sites	2 years

Upon retirement or sale, the Company removes the cost of assets disposed of and the related accumulated depreciation from the accounts and any resulting gain or loss is included in income (loss) from operations.

Impairment of Long-Lived Assets

The Company evaluates its long-lived assets, which consist primarily of property and equipment and intangible assets, for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Factors that the Company considers in deciding when to perform an impairment review include significant underperformance of the business in relation to expectations, significant negative industry or economic trends and significant changes or planned changes in the use of the assets. The Company measures recoverability of assets to be held and used by a comparison of the carrying amount of an asset to the future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the Company measures the impairment to be recognized by the amount by which the carrying amount of the asset exceeds the fair value of the asset, less the cost to sell. No events or changes in circumstances existed to require an impairment assessment during the years ended December 31, 2020, 2019 and 2018.

Deferred Offering Costs

The Company paid deferred offering costs of \$1,148 during the year ended December 31, 2018. No deferred offering costs were paid during the years ended December 31, 2020 and 2019.

Concentration of Risks

Financial instruments that potentially subject the Company to concentrations of credit risk consist principally of cash and cash equivalents and accounts receivable. Cash and cash equivalents consist of demand deposits, savings accounts, commercial paper, money market mutual funds, and certificates of deposit with financial institutions, which may exceed Federal Deposit Insurance Corporation limits. The Company has not experienced any losses related to its cash and cash equivalents and does not believe that it is subject to unusual credit risk beyond the normal credit risk associated with commercial banking relationships.

We grant credit to customers in the ordinary course of business. Credit evaluations are performed on an ongoing basis to reduce credit risk, and no collateral is required from our customers. An allowance for uncollectible accounts is provided for those accounts receivable considered to be uncollectible based upon historical experience and credit evaluation. Due to these factors, no additional losses beyond the amounts provided for collection losses is believed by management to be probable in the Company's accounts receivable.

Significant customers are those that represent 10% or more of revenue or accounts receivable and are set forth in the following tables:

	Revenue			Accounts Receivable, Net	
	Year Ended December 31,			December 31,	
	2020	2019	2018	2020	2019
Customer A	*	14%	27%	*	11%
Customer B	*	*	11%	*	*
Customer C	*	*	12%	*	14%
Customer D	*	*	14%	*	*
Customer E	*	*	*	*	19%
Customer F	20%	12%	*	*	*
Customer G	11%	*	*	14%	*

* Less than 10% of total

Customer B was a related party until October 19, 2018, Liberty Global Affiliates (see Note 17).

Certain of the components and subassemblies included in the Company's products are obtained from a single source or a limited group of suppliers. Although the Company seeks to reduce dependence on those limited sources of suppliers and manufacturers, the partial or complete loss of certain of these sources could have a material adverse effect on the Company's operating results, financial condition and cash flows and damage its customer relationships.

Goodwill and Intangible Assets

Goodwill represents the excess purchase price over the estimated fair value of net assets acquired as of the acquisition date. Goodwill has been recorded in connection with the acquisition of NetComm on July 1, 2019 (refer to Note 3). The Company tests goodwill for impairment on an annual basis and between annual tests when impairment indicators are identified, and goodwill is written down when impaired.

The Company performs its annual goodwill impairment test during its fourth quarter. For its annual goodwill impairment test, the Company operates under one reporting unit and the fair value of its reporting unit has been determined based on the Company's enterprise value. As part of the annual goodwill impairment test, the Company has the option to perform a qualitative assessment to determine whether further impairment testing is necessary. Examples of events and circumstances that might indicate that the reporting unit's fair value is less than its carrying amount include macro-economic conditions such as deterioration in the entity's operating environment or industry or market considerations; entity-specific events such as increasing costs, declining financial performance, or loss of key personnel; or other events such as a sustained decrease in the stock price on either an absolute basis or relative to peers. If, as a result of its qualitative assessment, it is more likely than not (i.e., greater than 50% chance) that the fair value of the Company's reporting unit is less than its carrying amount, the quantitative impairment test will be required. Otherwise, no further testing will be required. The Company completed its qualitative assessment and concluded that as of December 31, 2020, it is not more likely than not that the fair value of the Company's reporting unit is less than its carrying amount.

The Company amortizes its acquired intangible assets subject to amortization using the straight-line method over their estimated useful lives, ranging from 3 to 10 years. Purchased software licenses are classified as intangible assets and are amortized using the straight-line method over their estimated useful lives, typically ranging from 3 to 4 years. The Company evaluates the recoverability of intangible assets periodically by taking into account events or circumstances that may warrant revised estimates of useful lives or that indicate the asset may be impaired. The Company considered potential impairment indicators of acquired intangible assets at December 31, 2020 and noted no indicators of impairment.

Product Warranties

Substantially all of the Company's products are covered by a warranty for software and hardware for periods ranging from 90 days to one year. In addition, in conjunction with customers' renewals of maintenance and support contracts, the Company offers an extended warranty for periods typically of one to three years for agreed-upon fees. In the event of a failure of a hardware product or software covered by these warranties, the Company must repair or replace the software or hardware or, if those remedies are insufficient, and at the discretion of the Company, provide a refund. The Company's warranty reserve, which is included in accrued expenses and other current liabilities in the consolidated balance sheets,

reflects estimated material, labor and other costs related to potential or actual software and hardware warranty claims for which the Company expects to incur an obligation. The Company's estimates of anticipated rates of warranty claims and the costs associated therewith are primarily based on historical information and future forecasts. The Company periodically assesses the adequacy of the warranty reserve and adjusts the amount as necessary. If the historical data used to calculate the adequacy of the warranty reserve are not indicative of future requirements, additional or reduced warranty reserves may be required.

A summary of changes in the amount reserved for warranty costs for the years ended December 31, 2020, 2019 and 2018 is as follows:

	Year Ended December 31,		
	2020	2019	2018
Warranty reserve at beginning of year	\$ 2,448	\$ 926	\$ 1,246
Provisions	2,745	3,603	1,886
Acquired warranty reserve	—	1,867	—
Charges	(2,839)	(3,948)	(2,206)
Warranty reserve at end of year	<u>\$ 2,354</u>	<u>\$ 2,448</u>	<u>\$ 926</u>

The increase in the warranty charges and reserve for the year ended December 31, 2019 is primarily due to warranty obligations obtained with the acquisition of NetComm on July 1, 2019.

Revenue Recognition

Effective January 1, 2019, the Company adopted ASC Topic 606, Revenue from Contracts with Customers ("ASC 606") using the modified retrospective transition method. This method was applied to contracts that were not complete as of the date of initial application. The following is a summary of new and/or revised significant accounting policies affected by the Company's adoption of ASC 606, which relate primarily to revenue and cost recognition. Refer to Note 2, Summary of Significant Accounting Policies, in the Company's Annual Report on Form 10-K for the year ended December 31, 2018 for the policies in effect for revenue and cost recognition prior to January 1, 2019.

The Company generates revenue from sales of its products, along with associated maintenance, support and extended hardware warranty services, and to a lesser extent, from sales of professional services. The Company also generates revenue from sales of additional line cards and software-based capacity expansions. Maintenance and support services include telephone support, bug fixes and unspecified software upgrades and updates provided on a when-and-if-available basis and/or extended hardware warranty.

In its consolidated statements of operations and comprehensive income (loss), the Company classifies revenue from sales of cable products and fixed wireless access and fixed telco devices as product revenue, and revenue from maintenance and support and professional services as service revenue.

In accordance with ASC 606, the Company recognizes revenue when a customer obtains control of promised products or services. The amount of revenue recognized reflects the consideration that the Company expects to be entitled to receive in exchange for these products or services. To achieve the core principle of this standard, the Company applies the following five steps:

1) *Identify the contract with a customer* - The Company considers binding contracts and/or purchase orders to be customer contracts, provided collection is probable. The Company assesses collectability based on a number of factors that generally include information supplied by credit agencies, references and/or analysis of customer accounts and payment history. The Company combines contracts with customers if those contracts were negotiated as a single deal or contain price dependencies.

2) *Identify the performance obligations in the contract* - The Company identifies performance obligations as products and services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the product or service either on its own or together with other resources that are readily available from third parties or from the Company, and are distinct in the context of the contract, whereby the transfer of the products or services is separately identifiable from other promises in the contract.

3) *Determine the transaction price* - The Company determines the transaction price based on the consideration to which the Company expects to be entitled in exchange for transferring products or services to the customer. The Company

includes variable consideration in the transaction price if, in its judgment, it is probable that no significant future reversal of cumulative revenue under the contract will occur.

4) *Allocate the transaction price to performance obligations in the contract* – The Company allocates the transaction price to performance obligations based on a relative standalone selling price (“SSP”).

5) *Recognize revenue when or as the Company satisfies a performance obligation* – The Company recognizes revenue from product sales upon delivery to the customer, which is generally when control of the asset has passed to the customer. Support revenue is generally recognized over the contract period once the associated product’s control has been passed to the customer. Professional services revenue is recognized for the fee-based arrangements upon completion of the service and receipt of acceptance, if applicable.

Performance Obligations

The majority of the Company’s contracts with customers contain multiple performance obligations including products and maintenance services, and on a limited basis, professional services. For these contracts, the Company accounts for individual performance obligations separately if they are considered distinct. The Company’s cable, wireless and fixed telco products, maintenance services and professional services are considered distinct performance obligations. When multiple performance obligations exist in a customer contract, the Company allocates the transaction price to the separate performance obligations on a relative SSP basis. The Company determines SSP using its judgment and based on the best evidence available, which may include the selling price of products when sold on a standalone basis to similar customers in similar circumstances, or in the absence of standalone sales, taking into consideration the Company’s historical pricing practices by customer type, selling method (i.e. resellers or direct), and geographic-specific market factors.

Product revenue

The Company’s cable, wireless and fixed telco products generally have both software and non-software (i.e., hardware) components that function together to deliver the products’ essential functionality. The Company’s hardware generally cannot be used apart from the embedded software and is considered one distinct performance obligation. The Company recognizes revenue for both new and existing customers at a point in time when control of the products is transferred to the customer, which is typically when title and risk of loss have transferred and the right to payment is enforceable. The Company also earns revenue from the sale of perpetual software licenses and/or software-enabled capacity expansions. Revenue on perpetual software licenses and software-enabled capacity expansions for existing customers are also distinct performance obligations as they are separately identifiable and provide additional bandwidth capacity on hardware products already purchased by the customer. The Company recognizes revenue on perpetual software licenses and software-enabled capacity expansions when control is transferred, which is typically as the software entitlements are made available to the customer.

When customer contracts require acceptance of product and services, the Company considers the nature of the acceptance provisions to determine if they are substantive or considered perfunctory to determine if these acceptance provisions impact the timing of revenue recognition. When acceptance provisions are considered substantive, the Company will defer revenue on all performance obligations in the contract subject to acceptance until acceptance has been received. The Company does not defer revenue when acceptance provisions are deemed perfunctory.

Maintenance and Support Services and Professional Services Revenue

The Company generally sells its products with maintenance and support services, a distinct performance obligation that includes the stand-ready obligation to provide telephone support, bug fixes and unspecified software upgrades and updates provided on a when-and-if-available basis and/or extended hardware warranty. After the initial sale, customers may purchase annual renewals of support contracts. The Company’s telephone support and unspecified upgrades and updates are delivered over time and the Company therefore recognizes revenue ratably over the contract term, which is typically one year, but can be as long as five years. The Company also generates revenue from sales of professional services, such as installation, configuration and training. Professional services are a distinct performance obligation since the Company’s products are functional without these services and can generally be performed by the customer or a third party. The Company generally recognizes fee-based professional services delivered at a point in time as the professional services are completed and upon receipt of acceptance if applicable.

The sale of the Company’s products generally includes a 90-day warranty on the software and a one-year warranty on the hardware component of the products, which includes repair or replacement of the applicable hardware. These warranties are to ensure the products perform in accordance with the Company’s specifications and are therefore not a performance

obligation. The Company records a warranty accrual for the initial software and hardware warranty included with product sales and does not defer revenue.

Resellers and Sales Agents

The Company markets and sells its products through its direct global sales force, supported by sales agents, and through resellers. The Company's resellers receive an order from an end customer prior to placing an order with the Company, and the Company confirms the identification of or is aware of the end customer prior to accepting such order. The Company invoices the reseller an amount that reflects a reseller discount and records revenue based on the amount of the discounted transaction value. Aside from wireless and fixed telco hardware products, the Company's resellers do not stock inventory received from the Company.

When the Company transacts with a reseller, the contract is with the reseller and not with the end customer. Whether the Company transacts business with and receives the order directly from the reseller or a customer, its revenue recognition policy and resulting pattern of revenue recognition for the order are the same.

The Company has assessed whether it is principal (i.e., reports revenue on a gross basis) or agent (i.e., reports revenues on a net basis) by evaluating whether it has control of the good or service before it is transferred to the reseller. Generally, the Company controls the promised good or service before transferring it to the reseller and acts as the principal in the transaction. Accordingly, the Company reports revenues on a gross basis.

The Company also uses sales agents that assist in the sales process with certain customers, primarily located in the Latin America and Asia-Pacific regions. Sales agents are not resellers. If a sales agent is engaged in the sales process, the Company receives the order directly from the end customer and sells the products and services directly to the end customer, and the Company pays a commission to the sales agent, calculated as a percentage of the related transaction value. Accounting considerations related to sales agent commissions are discussed in the "Costs to Obtain or Fulfill a Contract" section below.

Costs to Obtain or Fulfill a Contract

The Company capitalizes commission expenses paid to internal sales personnel and sales agent commissions that are incremental to obtaining customer contracts, for which the related revenue is recognized over a future period greater than 12 months. These costs are incurred on initial sales of product, professional services and maintenance and support contract renewals. The Company defers these costs and amortizes them over the period of benefit, which is generally considered to be the contract term. The Company has elected to use the practical expedient, allowing the Company to recognize the incremental costs of obtaining a contract as an expense when incurred if the amortization period of the asset that the entity otherwise would have recognized is one year or less.

Commissions paid relating to maintenance and support contract renewals of twelve months or less are expensed as incurred as commissions paid on renewals are commensurate with commissions paid on initial sales transactions. Costs to obtain a contract for professional services contracts are expensed as incurred in accordance with the practical expedient as the contractual period of our professional services contracts are one year or less. The Company periodically reviews the carrying amount of capitalized contract costs to determine whether events or changes in circumstances have occurred that could impact the period of benefit.

Deferred Revenue

The Company recognizes amounts billed in excess of revenue recognized as deferred revenue. Deferred revenue includes customer deposits, amounts billed for maintenance and support services contracts in advance of services being performed, amounts for trade-in right liabilities and amounts related to contracts that have been deferred as a result of not meeting the required revenue recognition criteria as of the end of the reporting period. The Company reports deferred revenue expected to be recognized as revenue more than one year subsequent to the balance sheet date within long-term liabilities in the consolidated balance sheets.

The Company defers recognition of direct costs, such as cost of goods and services, until recognition of the related revenue. The Company classifies such costs as current assets if the related deferred revenue is classified as current and as non-current assets if the related deferred revenue is classified as non-current.

Other Revenue Recognition Policies

The Company's customary payment terms are generally 90 days or less. The Company has elected to apply the practical expedient that allows an entity to not adjust the promised amount of consideration in customer contracts for the effect of a significant financing component when the period between the transfer of product and services and payment of the related consideration is less than one year. If the Company provides extended payment terms that represent a significant financing component, the Company adjusts the amount of promised consideration for the time value of money using an appropriate discount rate and recognizes interest income separate from the revenue recognized on contracts with customers. During the year ended December 31, 2020 and 2019, the Company recorded \$64 and \$160, respectively, in interest income in its consolidated statements of operations and comprehensive income (loss) related to arrangements with customers that were determined to have a significant financing component.

In limited instances, the Company has offered future rebates to customers based on a fixed or variable percentage of actual sales volumes over specified periods. The future rebates earned based on the customer's purchasing from the Company in one period may be used as credits to be applied by them against accounts receivable due to the Company in later periods. The Company accounts for these future rebates as variable consideration and reduces the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will occur when the variable consideration is resolved. The Company estimates the reduction of the transaction price based on historical activity and other relevant factors and recognizes it when the Company recognizes revenue for the transfer of goods and services to the customer on which the future rebate was earned. Other forms of contingent revenue or variable consideration are infrequent.

The Company excludes any taxes assessed by a governmental authority that are directly imposed on a revenue-producing transaction (e.g., sales, use and value added taxes) from its transaction price.

The Company records billings to customers for reimbursement of out-of-pocket expenses, including travel, lodging and meals, as revenue, and the associated costs incurred by the Company as cost of revenue. Revenue related to the reimbursement of out-of-pocket costs are accounted for as variable consideration.

The Company accounts for any shipping and handling activities as a fulfillment cost rather than an additional promised service. The Company records shipping and handling billed to customers as an offset to cost of revenue.

Transition Disclosures

In accordance with the modified retrospective method transition requirements, the Company has presented the financial statement line items impacted and adjusted to compare to presentation under ASC Topic 605, *Revenue Recognition* ("ASC 605") as of and for the year ended December 31, 2019, which was the first year of adoption of ASC 606:

Balance Sheet	As of December 31, 2019		
	As Reported under ASC 606	Adjustments	Without adoption of ASC 606
Assets:			
Accounts receivable	\$ 93,100	\$ 47	\$ 93,147
Inventory	93,604	186	93,790
Prepaid expenses and other current assets	4,884	54	4,938
Prepaid income taxes	3,217	330	3,547
Accounts receivable, net of current portion	575	23	598
Deferred tax assets	69	1,757	1,826
Other assets	7,820	(69)	7,751
Total assets	<u>\$ 444,312</u>	<u>\$ 2,328</u>	<u>\$ 446,640</u>
Liabilities:			
Accrued expenses and other current liabilities	\$ 34,567	\$ (491)	\$ 34,076
Deferred revenue	25,485	8,194	33,679
Deferred revenue, net of current portion	4,583	1,856	6,439
Total liabilities	<u>405,748</u>	<u>9,559</u>	<u>415,307</u>
Stockholders' Equity:			
Accumulated deficit	(127,064)	(7,231)	(134,295)
Total stockholders' equity	<u>38,564</u>	<u>(7,231)</u>	<u>31,333</u>
Total liabilities and stockholders' equity	<u>\$ 444,312</u>	<u>\$ 2,328</u>	<u>\$ 446,640</u>

Total reported assets under ASC 606 as of December 31, 2019 were \$2,328 less than the total assets without the adoption of ASC 606 largely due to decreases in deferred tax assets, prepaid income taxes and deferred inventory costs

related to contracts for which deferred revenue was adjusted to retained earnings, partially offset by increases in prepaid expenses and other current assets and other assets related to contract costs capitalized under ASC 606 that would have been expensed when incurred under ASC 605.

Total reported liabilities under ASC 606 as of December 31, 2019 were \$9,559 less than the total liabilities without the adoption of ASC 606 primarily driven by the adjustment of deferred revenue related to a customer contract for which revenue was recognized based on receipt of cash payments under ASC 605 that would have been recognized upon product acceptance under ASC 606, offset by an increase in accrued partner commissions in accrued expenses and other current liabilities. These partner commissions were previously being recognized in the period in which cash was received and revenue was recognized. Upon the adoption of ASC 606, partner commissions are reflected as a cost to obtain a contract and they are expensed consistent with the pattern of revenue recognition on this contract.

Statement of Operations and Comprehensive (Loss) Income	Year Ended December 31, 2019		
	As Reported under ASC 606	Adjustments	Without adoption of ASC 606
Revenue:			
Product	\$ 241,377	\$ (6,201)	\$ 235,176
Service	40,920	197	41,117
Total revenue	282,297	(6,004)	276,293
Cost of revenue:			
Product	113,059	182	113,241
Gross profit	162,532	(6,186)	156,346
Operating expenses:			
Selling, general and administrative	88,320	231	88,551
Loss from operations	(9,119)	(6,417)	(15,536)
Other income (expense):			
Interest income	4,406	(159)	4,247
Loss before provision for (benefit from) income taxes	(24,415)	(6,576)	(30,991)
Provision for (benefit from) income taxes	23,791	(1,495)	22,296
Net loss	(48,206)	(5,081)	(53,287)
Comprehensive loss	\$ (49,270)	\$ (5,081)	\$ (54,351)
Net loss per share attributable to common stockholders:			
Basic	\$ (0.57)	\$ (0.07)	\$ (0.64)
Diluted	\$ (0.57)	\$ (0.07)	\$ (0.64)

During the year ended December 31, 2019, the adoption of ASC 606 resulted in a net increase to product revenue due to certain contracts for which product revenue was recognized upon delivery that would have been deferred without the adoption of ASC 606 due to the lack of vendor-specific objective evidence.

Statement of Cash Flows	Year Ended December 31, 2019		
	As Reported under ASC 606	Adjustments	Without adoption of ASC 606
Cash flows used in operating activities:			
Net loss	\$ (48,206)	\$ (5,081)	\$ (53,287)
Deferred income taxes	19,641	(1,166)	18,475
Changes in operating assets and liabilities:			
Accounts receivable	1,881	159	2,040
Inventory	(21,276)	182	(21,094)
Prepaid expenses and other assets	(3,679)	(322)	(4,001)
Prepaid income taxes	16	(330)	(314)
Accrued expenses and other current liabilities	(7,827)	554	(7,273)
Deferred revenue	(9,498)	6,004	(3,494)
Net cash used in operating activities	\$ (39,022)	\$ —	\$ (39,022)

During the year ended December 31, 2019, the adoption of ASC 606 resulted in offsetting changes in operating assets and liabilities and had no impact on net cash used in operations.

Stock-Based Compensation

The Company measures stock options and other stock-based awards granted to employees and directors based on the fair value on the date of the grant and recognizes compensation expense of those awards, net of estimated forfeitures, over the requisite service period, which is generally the vesting period of the respective award. Generally, the Company issues stock options with only service-based vesting conditions and records the expense for these awards using the straight-line method.

The Company classifies stock-based compensation expense in its consolidated statements of operations and comprehensive income (loss) in the same manner in which the award recipient's payroll costs are classified or in which the award recipient's service payments are classified.

The Company recognizes compensation expense for only the portion of awards that are expected to vest. In developing a forfeiture rate estimate, the Company has considered its historical experience to estimate pre-vesting forfeitures for service-based awards. The impact of a forfeiture rate adjustment will be recognized in full in the period of adjustment, and if the actual forfeiture rate is materially different from the Company's estimate, the Company may be required to record adjustments to stock-based compensation expense in future periods.

The Company estimates the fair value of each stock option grant on the date of grant using the Black-Scholes option pricing model. The Company was a private company until December 14, 2017 and lacks sufficient company-specific historical and implied volatility information for its stock. Therefore, it estimates its expected stock volatility based on the historical volatility of publicly traded peer companies and expects to continue to do so until such time as it has adequate historical data regarding the volatility of its own traded stock price. The expected term of the Company's stock options has been determined utilizing the "simplified" method for awards that qualify as "plain-vanilla" options. The expected term of stock options granted to non-employees is equal to the contractual term of the option award. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that the Company does not have a history of declaring or paying cash dividends, except for the special cash dividends declared in November 2014, June 2016, December 2016, May 2017 and November 2017 and in those circumstances the board of directors approved cash dividends to be paid to holders of the Company's stock options, stock appreciation rights ("SARs") and restricted stock units ("RSUs") upon vesting as an equitable adjustment to the holders of such instruments.

The Company has also granted SARs to certain employees, which require the Company to pay in cash upon exercise an amount equal to the product of the excess of the per share fair market value of the Company's common stock on the date of exercise over the exercise price, multiplied by the number of shares of common stock with respect to which the SAR is exercised. Because these awards may require the Company to settle the awards in cash, the Company accounts for them as a liability in the Company's consolidated balance sheets. The Company recognizes the liability related to these awards, as well as related compensation expense over the period during which services are rendered until completed. The Company estimates changes in the fair value of the SAR liability using the Black-Scholes option pricing model and records them in the consolidated statements of operations and comprehensive income (loss). After vesting is completed, the Company will continue to remeasure the fair market value of the liability until the award is either exercised or canceled, with changes in the fair value of the liability recorded in the consolidated statements of operations and comprehensive income (loss).

Research and Development Costs

The Company expenses research and development costs as incurred. The Company expenses costs incurred to develop software to be licensed to customers prior to the establishment of technological feasibility of the software and capitalizes them thereafter until commercial release of the software. The Company has not historically capitalized software development costs as the establishment of technological feasibility typically occurs shortly before the commercial release of its software, which is embedded in its products. As such, the Company expenses all software development costs related to software to be licensed to customers as incurred and includes such amounts within research and development expense in the accompanying consolidated statements of operations and comprehensive income (loss).

Advertising Costs

The Company expenses advertising costs as incurred and includes them in selling, general and administrative expense in the accompanying consolidated statements of operations and comprehensive income (loss). Advertising expenses were not significant for any periods presented.

Foreign Currency Translation

For the Company's subsidiaries in Ireland and Australia, the U.S. dollar is the functional currency. For each of the Company's other foreign subsidiaries, the functional currency is its local currency. Assets and liabilities of these foreign subsidiaries are translated into U.S. dollars using period-end exchange rates, and revenues and expenses are translated into U.S. dollars using average exchange rates in effect during each period. The Company includes the effects of these foreign currency translation adjustments in accumulated other comprehensive income (loss), a separate component of stockholders' equity.

The Company includes foreign currency transaction gains (losses) in its consolidated statements of operations and comprehensive income (loss) as a component of other income (expense). They totaled \$452, \$298 and \$(911) for the years ended December 31, 2020, 2019 and 2018, respectively.

Fair Value Measurements

The Company carries certain assets and liabilities at fair value under GAAP. Fair value is defined as the price that would be received for an asset or the exit price that would be paid to transfer a liability in the principal or most advantageous market in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. Financial assets and liabilities carried at fair value are to be classified and disclosed in one of the following three levels of the fair value hierarchy, of which the first two are considered observable and the last is considered unobservable:

- Level 1*— Quoted prices in active markets for identical assets and liabilities.
- Level 2*— Observable inputs (other than Level 1 quoted prices), such as quoted prices in active markets for similar assets or liabilities at the measurement date; quoted prices in markets that are not active for identical or similar assets and liabilities; or other inputs that are observable or can be corroborated by observable market data.
- Level 3*— Unobservable inputs that involve management judgment and are supported by little or no market activity, including pricing models, discounted cash flow methodologies and similar techniques.

The categorization of a financial instrument within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The Company carries cash equivalents, marketable securities, foreign currency forward contracts and SARs at fair value, determined according to the fair value hierarchy described above (see Note 7). The fair values of cash equivalents, accounts receivable, accounts payable and accrued expenses and other current liabilities approximate their fair values due to the short-term nature of these assets and liabilities, with the exception of amounts recorded by the Company as "accounts receivable, non-current," which represent amounts billed to customers for which payment has not yet become due and for which an offsetting amount of deferred revenue has been recorded. The carrying values of the Company's debt obligations (see Note 11) as of December 31, 2020 and 2019 approximated their fair values because the debt bears interest at rates the Company would be required to pay on the issuance of debt with similar terms, based on an analysis of recent market conditions and other Company-specific factors.

Income Taxes

The Company accounts for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement and tax basis of assets and liabilities, as measured by enacted tax rates anticipated to be in effect when these differences reverse. This method also requires the recognition of future tax benefits to the extent that realization of such benefits is more likely than not. Deferred tax expense or benefit is the result of changes in the deferred tax assets and liabilities. The Company assesses the likelihood that its deferred tax assets will be recovered from future taxable income and, to the extent it believes, based upon the weight of available evidence, that it is more likely than not that all or a portion of the deferred tax assets will not be realized, a valuation allowance is established through a charge to income tax expense. The Company evaluates the potential for recovery of deferred tax assets by estimating the future taxable profits expected and considering prudent and feasible tax planning strategies. As of December 31, 2020, the Company determined that it is more likely than not that a portion of its net U.S. deferred tax assets will not be realized, and thus has recognized a valuation allowance of \$24,463 against its net U.S. deferred tax assets that are not expected to be realized, a decrease of \$14,661 during the year ended December 31, 2020 (see Note 10).

The Company records a liability for potential payments of taxes to various tax authorities related to uncertain tax positions and other tax matters. The Company bases the recorded liability on its determination of whether and how much of a tax benefit taken by the Company in its tax filings or positions is “more likely than not” to be realized. The amount of the benefit that may be recognized in the financial statements is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. To the extent that the assessment of such tax positions changes, the Company records the change in estimate in the period in which the determination is made. The Company establishes a liability, which is included in accrued income taxes in the consolidated balance sheets, for tax-related uncertainties based on estimates of whether, and the extent to which, additional taxes will be due. The Company establishes these liabilities when the Company believes that certain positions might be challenged despite its belief that the tax return positions are fully supportable. The Company adjusts the recorded liability in light of changing facts and circumstances. The (benefit from) provision for income taxes includes the impact of the recorded liability and changes thereto.

The Company recognizes interest and penalties related to uncertain tax positions within other income (expense) in the accompanying consolidated statements of operations and comprehensive income (loss). The Company records accrued interest and penalties in accrued income taxes in the consolidated balance sheets.

For taxable years beginning after January 1, 2018, taxpayers are subjected to the global intangible low-taxed income (“GILTI”) provisions. The GILTI provisions require the Company to currently recognize in U.S. taxable income a deemed dividend inclusion of foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary’s tangible assets. The ability to benefit from a deduction and foreign tax credits against a portion of the GILTI income may be limited under the GILTI rules as a result of the utilization of net operating losses, foreign sourced income, and other potential limitations within the foreign tax credit calculation. During the years ended December 31, 2020 and 2019, the Company recorded an income tax charge of \$3,483 million and \$942 million, respectively related to GILTI. The Company has made an accounting policy election, as allowed by the SEC and FASB, to recognize the impacts of GILTI within the period incurred. Therefore, no U.S. deferred taxes are provided on GILTI inclusions of future foreign subsidiary earnings.

Comprehensive Income (Loss)

Comprehensive income (loss) includes net income (loss) as well as other changes in stockholders’ equity (deficit) that result from transactions and economic events other than those with stockholders. Comprehensive income (loss) for the periods presented consists of net income and the change in the cumulative foreign currency translation adjustment.

Net Income (Loss) per Share

Basic net income (loss) per share attributable to common stockholders is computed by dividing the net income (loss) attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period. Diluted net income (loss) attributable to common stockholders is computed by adjusting net income (loss) attributable to common stockholders to reallocate undistributed earnings based on the potential impact of dilutive securities. Diluted net income (loss) per share attributable to common stockholders is computed by dividing the diluted net income (loss) attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period, including potential dilutive common shares. For purpose of this calculation, outstanding stock-based awards are considered potential dilutive common shares.

Impact of Recently Adopted Accounting Standards

In June 2018, the Financial Accounting Standards Board (“FASB”) issued ASU 2018-07, Compensation – Stock Compensation (Topic 718) (“ASU 2018-07”), which expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. The Company adopted ASU 2018-07 as of January 1, 2020 and such adoption did not have a material effect on its consolidated financial statements.

In May 2014, the FASB issued ASC 606, which supersedes existing revenue recognition guidance under GAAP. The core principle of this standard is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services.

The Company adopted ASC 606 on January 1, 2019, using the modified retrospective method. Under this method of adoption, the Company recognized the cumulative effect of initially applying the new revenue standard as an adjustment to the opening balance of accumulated deficit. Comparative prior year periods were not adjusted.

As a result of applying the modified retrospective method to adopt ASC 606, the following adjustments were made to the consolidated balance sheet as of January 1, 2019:

	December 31, 2018		January 1, 2019
	As reported	Adjustments	As adjusted
Assets:			
Accounts receivable	\$ 81,782	\$ (153)	\$ 81,629
Inventory	50,997	(368)	50,629
Prepaid expenses and other current assets	3,755	209	3,964
Accounts receivable, net of current portion	2,388	(75)	2,313
Deferred tax assets	21,578	(592)	20,986
Other assets	3,293	128	3,421
Total assets	<u>\$ 474,649</u>	<u>\$ (851)</u>	<u>\$ 473,798</u>
Liabilities:			
Accrued expenses and other current liabilities	\$ 36,992	\$ 1,045	\$ 38,037
Deferred revenue	31,206	(2,190)	29,016
Deferred revenue, net of current portion	12,479	(1,856)	10,623
Total liabilities	<u>399,793</u>	<u>(3,001)</u>	<u>396,792</u>
Stockholders' equity:			
Accumulated deficit	(81,008)	2,150	(78,858)
Total stockholders' equity	74,856	2,150	77,006
Total liabilities and stockholders' equity	<u>\$ 474,649</u>	<u>\$ (851)</u>	<u>\$ 473,798</u>

Upon adoption of ASC 606 on January 1, 2019, the Company recorded a decrease to accumulated deficit of \$2,150 as a result of the transition. The impact of the adoption primarily relates to the cumulative effect of a \$4,046 total decrease in deferred revenue and deferred revenue, net of current portion primarily related to a customer contract for which revenue was recognized based on receipt of cash payments under ASC 605 that would have been recognized upon product acceptance under ASC 606; a \$1,045 increase in accrued expenses and other current liabilities related to partner commissions that were previously being recognized in the period in which cash was received and revenue was recognized, but would have been reflected as a cost to obtain a contract and expensed consistent with the pattern of revenue recognition on the contract; a \$368 decrease in inventory related to the adjustment of deferred cost of goods sold on deferred revenue also adjusted as part of the adoption; a \$337 total increase in prepaid expenses and other current assets and other assets for short term and long term capitalized contract costs on open contracts as of the adoption date; a \$228 total decrease in accounts receivable and accounts receivable, net of current portion related to a contract with a significant financing component; and a \$592 decrease in deferred tax assets related to the above items.

Impact of Recently Issued Accounting Standards

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842): Amendments to FASB Accounting Standards Codification ("ASU 2016-02"), which replaces the existing guidance for leases. ASU 2016-02 requires the identification of arrangements that should be accounted for as leases by lessees. In general, for lease arrangements exceeding a twelve-month term, the arrangements must now be recognized as assets and liabilities on the balance sheet of the lessee. Under ASU 2016-02, a right-of-use asset and lease obligation will be recorded for all leases, whether operating or financing, while the income statement will reflect lease expense for operating leases and amortization/interest expense for financing leases. The balance sheet amount recorded for existing leases at the date of adoption of ASU 2016-02 must be calculated using the applicable incremental borrowing rate at the date of adoption. This guidance will become effective for private companies, and emerging growth companies that choose to take advantage of the extended transition periods, for annual reporting periods beginning after December 15, 2020, and interim periods within fiscal years beginning after December 15, 2021. The Company has begun planning for adoption by implementing new lease accounting software and by working to establish additional changes to internal processes to comply with all requirements upon adoption. The standard allows for, and the Company plans on using, a modified retrospective approach with comparatives under ASC 840, where entities would recognize a cumulative effect to retained earnings at the date of adoption without restating prior period balances or disclosure. Management is continuing to assess the impact of ASU 2016-02 on the Company's consolidated financial statements and the accompanying notes thereto.

In June 2016, the FASB issued ASU 2016-13, Measurement of Credit Losses on Financial Instruments ("ASU 2016-13"). This guidance is intended to provide more decision-useful information about expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. The main provisions include presenting financial assets measured at amortized cost at the amount expected to be collected, which is net of an

allowance for expected credit losses, and recording credit losses related to available-for-sale securities through an allowance for credit losses. The effective dates for the amendments in ASU 2016-13 were updated in ASU 2019-10, Financial Instruments – Credit Losses (Topic 326), Derivatives and Hedging (Topic 815), and Leases (Topic 842), and as such ASU 2016-13 will become effective for private companies, and emerging growth companies that choose to take advantage of the extended transition periods, for fiscal years beginning after December 15, 2022, including interim periods within those fiscal periods, and must be applied using a modified retrospective approach. The Company is currently evaluating the impact ASU 2016-13 will have on its consolidated financial statements.

3. Business Acquisition

On July 1, 2019, the Company acquired 100% of the equity interests in NetComm for cash consideration of \$161,963 AUD (\$112,674 USD, based on an exchange rate of USD \$0.700 per AUD \$1.00 on July 1, 2019) and NetComm became a wholly-owned subsidiary of the Company. The Company accounted for the Acquisition under the acquisition method. The total purchase price was allocated to the tangible and intangible assets acquired and the liabilities assumed based on their estimated fair values. The Company recorded the excess of the purchase price over those fair values as goodwill. The Company based the fair value assigned to the tangible and intangible assets acquired and liabilities assumed on estimates and assumptions provided by management. The Company does not amortize goodwill but instead tests for impairment at least annually.

The Company allocated the total purchase price to NetComm's net tangible and intangible assets based upon their estimated fair values as of the date of Acquisition. NetComm's cash and cash equivalents balance at the Acquisition date was \$3,243; as such, total consideration net of cash acquired was \$109,431. The Company accounted for NetComm's existing debt of approximately \$3,507 as of the Acquisition date as an assumed liability. All contractual accounts receivable as of July 1, 2019, which totaled \$18,142, have been collected as of December 31, 2020. Based upon the purchase price and the valuation, the allocation of the total purchase price was as follows:

	Purchase Price Allocation	
Assets acquired		
Fair value of tangible assets:		
Accounts receivable	\$	18,142
Inventory		24,138
Prepaid expenses and other current assets		2,240
Property, plant and equipment		8,010
Deferred tax assets		365
Other assets		13
Goodwill		50,177
Identifiable intangible assets		44,000
Total assets acquired	\$	<u>147,085</u>
Liabilities assumed		
Accounts payable	\$	(9,719)
Accrued expenses		(13,178)
Accrued income taxes		(140)
Deferred tax liabilities		(10,621)
Current portion of long-term debt		(3,507)
Other liabilities		(489)
Total liabilities assumed	\$	<u>(37,654)</u>
Net assets acquired	\$	<u>109,431</u>

The allocation of the purchase price and the estimated useful lives associated with certain assets is as follows:

	Amount	Estimated Useful Life
Net tangible assets	\$ 15,254	—
Identifiable intangible assets:		
Developed technology	25,000	7 years
Customer relationships	18,000	10 years
Trade name	1,000	3 years
Goodwill	50,177	—
Total purchase price	\$ <u>109,431</u>	

The Company allocated \$44,000 to identifiable intangible assets consisting of developed technology, amortized over seven years using a straight-line amortization method; customer relationships, amortized over ten years using a straight-line amortization method; and a trade name, amortized over three years using a straight-line amortization method. The weighted-average life of the identifiable intangible assets recognized from the Acquisition was 8.2 years. The intangible assets acquired in the Acquisition are not deductible for tax purposes.

NetComm is a global leader in the development of fixed wireless and fiber-to-the-distribution-point broadband solutions. With the Acquisition, the combined Company now offers a broad, highly competitive product portfolio for new 4G and 5G fixed wireless access products and customer premise equipment for public and private service providers and enterprise networks. This factor contributed to a purchase price in excess of fair value of NetComm's net tangible and intangible assets, leading to the recognition of goodwill of \$50,177. Additional factors that contributed to the establishment of goodwill included the strategic benefit of expanding the breadth of the Company's product offerings; the value of NetComm's highly trained work force; the expected revenue growth over time that is attributable to increased market penetration from future products and customers, and cross-selling by the sales force; and the synergies expected to result from reducing redundant infrastructure such as corporate costs and field operations. The goodwill acquired in the Acquisition is not deductible for tax purposes.

The results of operations of NetComm have been included in the Company's consolidated statements of operations and comprehensive (loss) income since the completion of the Acquisition on July 1, 2019. For the year ended December 31, 2019, NetComm contributed \$75,769 to the Company's consolidated net revenues and \$1,424 in after tax losses to the Company's consolidated net loss. Transaction costs of \$3,494 are included in selling, general and administrative expenses in the consolidated statements of operations and comprehensive (loss) income for the year ended December 31, 2019.

The unaudited pro forma financial information shown below summarizes the combined results of operations for the Company and NetComm as if the closing of the Acquisition had occurred on January 1, 2017, the first day of the Company's fiscal year 2018. The unaudited pro forma financial information includes adjustments that are directly attributable to the business combination and are factually supportable. The adjustments primarily reflect the amortization of acquired intangible assets, the conversion of NetComm's financial results from International Financial Reporting Standards to U.S. GAAP, transaction costs related to the Acquisition, as well as the pro forma tax impact for such adjustments at the statutory rate. The pro forma financial information also reflects a \$3,200 adjustment for the amortization of the step up of inventory fair value that is directly attributable to the business combination, but is not expected to have a continuing impact on the results of operations.

The unaudited pro forma results below do not reflect the expected realization of cost savings following the Acquisition or anticipated costs the Company will incur to realize such synergies. These savings are expected to result from streamlining of product development initiatives, alignment of overlapping functional areas, such as sales and marketing and certain general and administrative functions. Although management expects that cost savings will result from the Acquisition, there can be no assurance that these cost savings will be achieved. Accordingly, these unaudited pro forma results are presented for informational purposes only and are not necessarily indicative of what the actual results of operations of the combined company would have been if the Acquisition had occurred on January 1, 2017, nor are they indicative of future results of operations.

The unaudited pro forma combined results of the Company and NetComm are as follows:

	Year Ended December 31,		
	2020	2019	2018
Net revenue	\$ 393,246	\$ 375,306	\$ 436,791
Net income (loss)	25,134	(47,898)	68,808

4. Goodwill and Intangibles

Intangible assets, net

Intangible assets, net consisted of intangible assets resulting from the acquisition of NetComm and purchased software to be used in our products. Intangible assets, net consisted of the following at December 31, 2020 and 2019, respectively:

	As of December 31, 2020		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Developed technology	25,000	(5,358)	19,642
Customer relationships	18,000	(2,700)	15,300
Trade name	1,000	(498)	502
Purchased Software	432	(32)	400
Totals as of December 31, 2020	<u>\$ 44,432</u>	<u>\$ (8,588)</u>	<u>\$ 35,844</u>

	As of December 31, 2019		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Developed technology	25,000	(1,786)	23,214
Customer relationships	18,000	(900)	17,100
Trade name	1,000	(166)	834
Totals as of December 31, 2019	<u>\$ 44,000</u>	<u>\$ (2,852)</u>	<u>\$ 41,148</u>

As of December 31, 2020, amortization expense on existing intangible assets for the next five years and beyond is summarized as follows:

Year Ending December 31,	
2021	\$ 5,849
2022	5,681
2023	5,484
2024	5,372
2025	5,372
Thereafter	8,086
	<u>\$ 35,844</u>

A summary of amortization expense recorded during the years ended December 31, 2020 and 2019 is as follows:

	Year Ended December 31,	
	2020	2019
Product cost of revenue	\$ 3,571	\$ 1,786
Research and development	32	—
Selling, general and administrative	2,133	1,066
Totals	<u>\$ 5,736</u>	<u>\$ 2,852</u>

Goodwill

The changes in the carrying value of goodwill are as follows:

	Carrying Value of Goodwill
Balance at December 31, 2018	\$ —
NetComm Acquisition	50,347
Balance at December 31, 2019	50,347
Adjustment recorded to preliminary purchase price allocation	(170)
Balance at December 31, 2020	<u>\$ 50,177</u>

5. Inventory

Inventory as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Raw materials	\$ 50,904	\$ 19,821
Work in process	19	17
Finished goods:		
Manufactured finished goods	49,764	69,503
Deferred inventory costs	517	4,263
	<u>\$ 101,204</u>	<u>\$ 93,604</u>

The increase in gross inventory balances was due to manufacturing to fill existing orders and to meet anticipated future demand for the Company's products.

6. Property and Equipment

Property and equipment as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Computers and purchased software	\$ 24,865	\$ 22,294
Leasehold improvements	4,148	4,380
Furniture and fixtures	2,644	2,794
Machinery and equipment	36,701	40,002
Land	3,091	3,091
Building	4,765	4,765
Building improvements	7,244	6,776
Trial systems at customers' sites	5,300	6,039
	<u>88,758</u>	<u>90,141</u>
Less: Accumulated depreciation and amortization	(59,878)	(54,231)
	<u>\$ 28,880</u>	<u>\$ 35,910</u>

During the years ended December 31, 2020, 2019 and 2018, the Company transferred trial systems (into) from inventory into (from) property and equipment with values of \$(1,259), \$(502) and \$(357), respectively, net of transfers of trial systems to cost of revenue. In addition, the Company transferred \$(805), \$(261) and \$371 of equipment from inventory into property and equipment during the years ended December 31, 2020, 2019 and 2018, respectively.

Total depreciation and amortization expense on property and equipment totaled \$12,234, \$11,870, and \$9,454 for the years ended December 31, 2020, 2019 and 2018, respectively.

7. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Accrued compensation and related taxes	\$ 22,722	\$ 18,540
Accrued warranty (see Note 2)	2,354	2,448
Dividends and equitable adjustments payable (see Note 12)	63	750
Accrued customer incentives	20	233
Other accrued expenses	14,634	12,596
	<u>\$ 39,793</u>	<u>\$ 34,567</u>

8. Fair Value Measurements

The Company's cash equivalents include certificates of deposit and money market mutual funds, which are valued using Level 1 or Level 2 inputs in the fair value hierarchy. The Company's marketable securities consist of certificates of deposit, which are valued using Level 2 inputs in the fair value hierarchy. The Company's foreign currency forward contracts are valued using Level 2 inputs in the fair value hierarchy. The Company values its SARs using Level 3 inputs in the fair value hierarchy based on management's judgment and the assumptions set forth in Note 13 as there is no market activity to derive an estimate of their fair value. The Company records changes in the fair value of SARs in operating expenses in the consolidated statements of operations and comprehensive income (loss).

The following tables present information about the fair value of the Company's financial assets and liabilities as of December 31, 2020 and 2019 and indicate the level of the fair value hierarchy utilized to determine such fair values:

	Fair Value Measurements as of December 31, 2020 Using:			
	Level 1	Level 2	Level 3	Total
Assets:				
Certificates of deposit—restricted cash	\$ —	\$ 1,006	\$ —	\$ 1,006
Money market mutual funds	114,404	—	—	114,404
	<u>\$ 114,404</u>	<u>\$ 1,006</u>	<u>\$ —</u>	<u>\$ 115,410</u>
Liabilities:				
SARs	\$ —	\$ —	\$ 493	\$ 493
	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 493</u>	<u>\$ 493</u>

	Fair Value Measurements as of December 31, 2019 Using:			
	Level 1	Level 2	Level 3	Total
Assets:				
Certificates of deposit	\$ —	\$ 10,933	\$ —	\$ 10,933
Certificates of deposit—restricted cash	—	1,019	—	1,019
Money market mutual funds	53,763	—	—	53,763
Foreign currency forward contracts	—	23	—	23
	<u>\$ 53,763</u>	<u>\$ 11,975</u>	<u>\$ —</u>	<u>\$ 65,738</u>
Liabilities:				
SARs	\$ —	\$ —	\$ 264	\$ 264
Foreign currency forward contracts	—	50	—	50
	<u>\$ —</u>	<u>\$ 50</u>	<u>\$ 264</u>	<u>\$ 314</u>

During the years ended December 31, 2020, 2019 and 2018 there were no transfers between Level 1, Level 2 and Level 3.

The liability for SARs in the table above consists of the fair value of the SARs granted to the Company's employees. The fair values of the SARs are based on significant inputs not observable in the market, which represents a Level 3 measurement within the fair value hierarchy. The Company's valuation of these SARs utilized the Black-Scholes option-pricing model, which incorporates assumptions and estimates to determine their fair values (see Note 2). The Company assesses these assumptions and estimates on a quarterly basis as additional information impacting the assumptions is obtained. The Company recognizes changes in the fair value of the SARs liability as stock-based compensation expense in the consolidated statements of operations and comprehensive income (loss).

The following table provides a summary of changes in the fair values of the Company's SARs liability, for which fair value is determined by Level 3 inputs:

	Year Ended December 31,		
	2020	2019	2018
Fair value at beginning of the year	\$ 264	\$ 1,387	\$ 2,155
Change in fair value	229	(1,123)	(768)
Exercises	—	—	—
Fair value at end of year	<u>\$ 493</u>	<u>\$ 264</u>	<u>\$ 1,387</u>

The Company's cash, cash equivalents and restricted cash as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Cash	\$ 43,051	\$ 48,942
Cash equivalents and restricted cash:		
Certificates of deposit	—	10,933
Certificates of deposit—restricted cash	1,006	1,019
Money market mutual funds	114,404	53,763
Total cash equivalents and restricted cash	<u>115,410</u>	<u>65,715</u>
Total cash, cash equivalents and restricted cash	<u>\$ 158,461</u>	<u>\$ 114,657</u>

9. Derivative Instruments

The Company has certain international customers that are billed in foreign currencies. To mitigate the volatility related to fluctuations in the foreign exchange rates for accounts receivable denominated in foreign currencies, the Company enters into foreign currency forward contracts. As of December 31, 2020, the Company had no foreign currency forward contracts outstanding. As of December 31, 2019, the Company had foreign currency forward contracts outstanding with notional amounts totaling 500 Euros and 900 USD related to the Company's Australian subsidiary. These contracts matured during the first quarter of 2020.

The Company's foreign currency forward contracts described above economically hedged certain risks, but were not designated as hedges for financial reporting purposes, and accordingly, the Company recorded all changes in the fair value of the derivative instruments as unrealized foreign currency transaction gains or losses and included them in the consolidated statements of operations and comprehensive income (loss) as a component of other income (expense). The Company records derivative instruments in the consolidated balance sheet at their fair values. As of December 31, 2020, the Company recorded no asset or liability relating to outstanding foreign currency forward contracts. As of December 31, 2019, the Company recorded an asset of \$23 and a liability of \$50 related to outstanding foreign currency forward contracts, which were included in prepaid expenses and other current assets and in accrued expenses and other current liabilities, respectively, in the consolidated balance sheets.

The Company also faces exposure to foreign currency exchange rate fluctuations, as a certain portion of its expenses are denominated in currencies other than U.S. Dollars. In certain instances, the Company utilizes forward contracts to hedge against foreign currency fluctuations. These contracts are used to minimize foreign gains or losses, as the gains or losses on the derivative are intended to offset the losses or gains on the underlying exposure. The Company does not engage in foreign currency speculation.

The Company designed its foreign currency risk management strategy principally to mitigate the potential financial impact of changes in the value of transactions and balances denominated in foreign currencies resulting from changes in foreign currency exchange rates. The Company may enter into cash flow hedges which utilize foreign currency forward contracts to hedge specific forecasted transactions of its foreign subsidiaries with the goal of protecting its budgeted expenses against foreign currency exchange rate changes compared to its budgeted rates.

During the year ended December 31, 2020, the Company settled two cash flow hedges with notional amounts of 8,500 AUD and 5,000 AUD to hedge certain Australian Dollar cash flows incurred during the period. The Company reclassified the amount of \$752 from other comprehensive income (loss) for the year ended December 30, 2020. The Company recognized the full amount of the fair value of the derivatives on the settlement date of \$1,613 proportionately as \$124 cost of goods sold, \$890 research and development expense and \$599 selling, general and administrative expense in the consolidated statement of comprehensive income for the year ended December 31, 2020. The Company did not have any cash flow hedges outstanding as of December 31, 2020 and December 31, 2019.

10. Income Taxes

Income before the (benefit from) provision for income taxes for the years ended December 31, 2020, 2019 and 2018 consisted of the following:

	Year Ended December 31,		
	2020	2019	2018
United States	\$ (32,755)	\$ (40,055)	\$ 10,527
Foreign	42,504	15,640	55,411
	<u>\$ 9,749</u>	<u>\$ (24,415)</u>	<u>\$ 65,938</u>

The (benefit from) provision for income taxes for the years ended December 31, 2020, 2019 and 2018 consisted of the following:

	Year Ended December 31,		
	2020	2019	2018
Current income tax (benefit) provision:			
Federal	\$ (24,409)	\$ 4,698	\$ (3,457)
State	228	(121)	(181)
Foreign	11,655	(427)	8,087
Total current income tax (benefit) provision	<u>(12,526)</u>	<u>4,150</u>	<u>4,449</u>
Deferred income tax (benefit) provision:			
Federal	171	18,387	(10,699)
State	97	5,100	(1,108)
Foreign	(2,794)	(3,846)	290
Total deferred income tax (benefit) provision	<u>(2,526)</u>	<u>19,641</u>	<u>(11,517)</u>
Total income tax (benefit) provision	<u>\$ (15,052)</u>	<u>\$ 23,791</u>	<u>\$ (7,068)</u>

A reconciliation of the U.S. federal statutory rate to the Company's effective income tax rate for the years ended December 31, 2020, 2019 and 2018 is as follows:

	Year Ended December 31,		
	2020	2019	2018
Federal statutory income tax rate	21.0%	21.0%	21.0%
State taxes, net of federal tax benefit	(6.8)	9.8	(0.8)
Research and development tax credits	(37.6)	10.3	(15.6)
Permanent differences	(11.5)	(1.6)	1.1
Foreign tax rate differential	7.3	10.2	(6.6)
Equitable adjustment payments	(1.1)	1.7	(1.8)
Stock-based compensation	9.7	3.3	(25.2)
Foreign taxes withheld	23.1	(9.6)	3.3
Rate impact from CARES Act	(63.9)	—	—
Global intangible low-taxed income	35.7	(4.1)	6.7
Withholding tax on repatriation of accumulated earnings of foreign subsidiaries	1.0	(0.1)	0.1
Valuation allowance on deferred tax assets	(146.9)	(144.2)	6.0
Other, net	(3.6)	2.3	1.1
Foreign derived intangible income	—	3.9	—
Research and development costs	20.0	(4.3)	—
Provision to return	2.4	11.1	—
Uncertain tax positions	(3.2)	(7.1)	—
Effective income tax rate	<u>(154.4)%</u>	<u>(97.4)%</u>	<u>(10.7)%</u>

The income tax effect of each type of temporary difference and carryforward as of December 31, 2020 and 2019 was as follows:

	December 31,	
	2020	2019
Deferred tax assets:		
Stock compensation	\$ 4,710	\$ 3,827
Tax credit carryforwards	13,138	9,900
Capitalized research and development costs	9,710	21,376
Inventory valuation	2,169	1,756
Accrued liabilities and reserves	3,826	5,207
Deferred revenue	796	1,520
Interest expense	—	2,149
Intellectual property rights	999	999
Other	2,228	544
Total deferred tax assets	<u>37,576</u>	<u>47,278</u>
Valuation Allowance	<u>(24,463)</u>	<u>(39,124)</u>
Deferred tax assets, net of valuation allowance	13,113	8,154
Deferred tax liabilities:		
Depreciation	(2,092)	(1,159)
Amortization	(10,932)	(12,727)
Deferred costs	(3,444)	—
Withholding tax on unremitted earnings	(2,650)	(2,604)
Prepaid expenses	(127)	(588)
Total deferred tax liabilities	<u>(19,245)</u>	<u>(17,078)</u>
Net deferred tax liabilities	<u>\$ (6,132)</u>	<u>\$ (8,924)</u>

The Company has determined that it is more likely than not its net U.S. deferred tax assets will not be realized. As of December 31, 2020, the Company maintains a valuation allowance of \$24,463 against its net U.S. deferred tax assets, a decrease of \$14,661 during the year ended December 31, 2020. The change in valuation allowance is primarily due to the Company's ability to carryback U.S. net operating losses under the CARES Act which was enacted during 2020, which

resulted in the release of valuation allowance against certain deferred tax assets that could be carried back to prior tax years. The Company does not anticipate sufficient taxable income or tax liability to utilize its net U.S. deferred tax assets in the foreseeable future. The Company will continue to monitor the realizability of its net U.S. deferred tax assets and take into account multiple factors, including recent operating results, existing taxable temporary differences, future taxable income projections and tax planning strategies. The Company intends to maintain a valuation allowance on its net U.S. deferred tax assets until there is sufficient positive evidence to support the reversal of all or some portion of the valuation allowances. The release of all, or a portion of, the valuation allowance would result in the recognition of certain deferred tax assets and a decrease to income tax expense for the period the release is recorded.

On March 27, 2020, the Coronavirus Aid, Relief and Economic Security (“CARES Act”) was signed into law. Among other things, the CARES Act permits net operating loss (“NOL”) carryovers and carrybacks to offset 100% of taxable income for taxable years beginning before 2021. In addition, the CARES Act allows NOLs incurred in 2018, 2019, and 2020 to be carried back to each of the five preceding taxable years to generate a refund of previously paid income taxes. The Company recorded a benefit of \$23,518 due to the carryback of our 2019 and 2020 U.S. NOLs which resulted in a tax benefit at a higher tax rate in the carryback period, as well as a reduction to the valuation allowance on deferred tax assets that were previously determined to not be more-likely-than-not realizable. The CARES Act also contains modifications on the limitation of business interest for tax years beginning in 2019 and 2020. The modifications to Section 163(j) increase the allowable business interest deduction from 30% of adjusted taxable income to 50% of adjusted taxable income.

Effective for taxable years beginning after January 1, 2018, taxpayers are subjected to the GILTI provisions. The GILTI provisions require the Company to currently recognize in U.S. taxable income a deemed dividend inclusion of foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary’s tangible assets. The ability to benefit from a deduction and foreign tax credits against a portion of the GILTI income may be limited under the GILTI rules as a result of the utilization of net operating losses, foreign sourced income, and other potential limitations within the foreign tax credit calculation. The Company made an accounting policy election, as allowed by the SEC and FASB, to recognize the impacts of GILTI within the period incurred. During the years ended December 31, 2020 and 2019, the Company recorded income tax charges of \$3,483 and \$942, respectively, related to GILTI.

As of December 31, 2020, the Company had federal NOL carryforwards of \$476 that can be carried forward indefinitely and state NOL carryforwards of \$21,714, of which \$14,402 will begin to expire in 2030 and \$7,312 can be carried forward indefinitely. As of December 31, 2020, the Company had available federal and state research and development tax credit carryforwards of \$1,269 and \$10,812, respectively, which begin to expire in 2030. Management believes that it is more likely than not that the Company will not realize the benefit of its federal and state net operating losses and research and development tax credits and thus has recorded a valuation allowance against these deferred tax assets.

As of December 31, 2020, the Company had foreign net operating loss carryforwards of \$1,034 of which \$662 will expire in 2024 and \$371 can be carried forward indefinitely. As of December 31, 2020, the Company had foreign research and development tax credit carryforwards of \$13,875, which do not expire. Management has recorded an uncertain tax position of \$11,806 related to these credits.

As of December 31, 2020, substantially all of the Company’s unremitted earnings have been taxed through either the deemed repatriation tax or as GILTI income. Of the total amount of undistributed earnings, \$26,494 is not indefinitely reinvested and the Company has recorded a \$2,649 deferred tax liability related to its withholding taxes associated with such undistributed earnings. The Company has not provided U.S. deferred income taxes or foreign withholding taxes on unremitted earnings of foreign subsidiaries of approximately \$135,384 as such amounts are considered to be indefinitely reinvested in the business. The Company does not believe it is practicable to estimate the amount of income taxes payable on the earnings that are indefinitely reinvested in foreign operations, however a significant portion of the unremitted earnings could be remitted without a future tax cost.

The Company records interest and penalties related to uncertain tax positions in its consolidated statements of operations and comprehensive income within other income (expense). Interest and penalties included in the statement of operations were \$614, \$1,278 and \$211 for the years ended December 31, 2020, 2019 and 2018, respectively. The Company recorded a liability for interest and penalties of \$2,260 and \$1,646 as of December 31, 2020 and 2019, respectively. As of December 31, 2020, the amount of uncertain tax benefits that, if recognized, would impact the effective income tax rate was \$17,668.

The aggregate changes in the balance of gross uncertain tax positions, which excludes interest and penalties, for the years ended December 31, 2020, 2019 and 2018 were as follows:

Balance at December 31, 2017	\$	1,695
Settlement/decreases related to tax positions taken during prior years		—
Increases related to tax positions taken during prior years		241
Increases related to tax positions taken during the current year		810
Balance at December 31, 2018		2,746
Settlement/decreases related to tax positions taken during prior years		(49)
Increases related to tax positions taken during prior years		18,434
Increases related to tax positions taken during the current year		364
Balance at December 31, 2019		21,495
Expiration of statute of limitations		(1,174)
Decreases related to tax positions taken during prior years		(2,815)
Increases related to tax positions taken during prior years		155
Increases related to tax positions taken during the current year		249
Balance at December 31, 2020	\$	<u>17,910</u>

The Company and its subsidiaries file income tax returns in the U.S. federal jurisdiction as well as various states and foreign jurisdictions. The Company and certain subsidiaries have tax years that remain open and are subject to examination by tax authorities in the following major taxing jurisdictions: United States for tax years 2017 through 2020, Ireland for tax years 2016 through 2020, China for tax years 2010 through 2020 and Australia for tax years 2016 through 2020. The Company files income tax returns on a combined, unitary, or stand-alone basis in multiple state and local jurisdictions, which generally have statutes of limitations from three to four years. If any issues addressed in the Company's tax audits are resolved in a manner not consistent with management's expectations, the Company would be required to adjust its provision for income tax in the period such resolution occurs. The Company's unrecognized tax benefits could change up to \$4,344 in the next 12 months due to the expiration of the statute of limitations.

11. Debt

The aggregate principal amount of debt outstanding as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Term loans	\$ 288,000	\$ 291,000
Revolving credit facility	6,500	—
Mortgage loan	—	6,644
Total principal amount of debt outstanding	<u>\$ 294,500</u>	<u>\$ 297,644</u>

Current and non-current debt obligations reflected in the consolidated balance sheets as of December 31, 2020 and 2019 consisted of the following:

	December 31,	
	2020	2019
Current liabilities:		
Term loans	\$ 9,775	\$ 3,000
Revolving credit facility	6,500	—
Mortgage loan	—	6,644
Current portion of principal payment obligations	16,275	9,644
Unamortized debt issuance costs, current portion	(1,104)	(1,120)
Current portion of long-term debt, net of unamortized debt issuance costs	<u>\$ 15,171</u>	<u>\$ 8,524</u>
Non-current liabilities:		
Term loans	\$ 278,225	\$ 288,000
Unamortized debt issuance costs, non-current portion	(2,140)	(3,244)
Long-term debt, net of current portion and unamortized debt issuance costs	<u>\$ 276,085</u>	<u>\$ 284,756</u>

As of December 31, 2020, aggregate minimum future principal payments of the Company's debt are summarized as follows:

Year Ending December 31,	
2021	\$ 16,275
2022	3,000
2023	275,225
Thereafter	—
	<u>\$ 294,500</u>

Term Loan and Revolving Credit Facilities

On December 20, 2016, the Company entered into a credit agreement with JPMorgan Chase Bank, N.A., as administrative agent, various lenders and JPMorgan Chase Bank, N.A. and Barclays Bank PLC providing for (i) a term loan facility of \$300,000 and (ii) a revolving credit facility of up to \$25,000 in revolving credit loans and letters of credit.

As of December 31, 2020 and 2019, \$288,000 and \$291,000 in principal amount, respectively, were outstanding under the term loan facility (the "Term Loans") and as of December 31, 2020, the Company had outstanding borrowings under the revolving credit facility of \$6,500 that were drawn down during the year ended December 31, 2020. As of December 31, 2019, the Company had no outstanding borrowings under the revolving credit facility. As of December 31, 2020 and 2019, the Company had also used \$1,454 and \$1,343 of availability under the revolving credit facility for two stand-by letters of credit, one which served as collateral to one of the Company's customers pursuant to a contractual obligation and one which is used as collateral for operating leases in Australia. In addition, the Company may, subject to certain conditions, including the consent of the administrative agent and the institutions providing such increases, increase the facilities by an unlimited amount so long as the Company is in compliance with specified leverage ratios, or otherwise by up to \$70,000.

Borrowings under the facilities bear interest at a floating rate, which can be either a Eurodollar rate plus an applicable margin or, at the Company's option, a base rate (defined as the highest of (x) the JPMorgan Chase, N.A. prime rate, (y) the federal funds effective rate, plus one-half percent (0.50%) per annum and (z) a one-month Eurodollar rate plus 1.00% per annum) plus an applicable margin. The applicable margin for borrowings under the term loan facility is 4.00% per annum for Eurodollar rate loans (subject to a 1.00% per annum interest rate floor) and 3.00% per annum for base rate loans. The applicable margin for borrowings under the revolving credit facility is 1.75% per annum for Eurodollar rate loans and 0.75% per annum for base rate loans, subject to reduction based on the Company's maintaining of specified net leverage ratios. The interest rates payable under the facilities are subject to an increase of 2.00% per annum during the continuance of any payment default.

For Eurodollar rate loans, the Company may select interest periods of one, three or six months or, with the consent of all relevant affected lenders, twelve months. Interest will be payable at the end of the selected interest period, but no less frequently than every three months within the selected interest period. Interest on any base rate loan is not set for any specified period and is payable quarterly. The Company has the right to convert Eurodollar rate loans into base rate loans and the right to convert base rate loans into Eurodollar rate loans at its option, subject, in the case of Eurodollar rate loans, to breakage costs if the conversion is effected prior to the end of the applicable interest period. As of December 31, 2020, the interest rate on the Term Loans was 5.00% per annum, which was based on a one-month Eurodollar rate of 1.00% per annum plus the applicable margin of 4.00% per annum for Eurodollar rate loans. As of December 31, 2019, the interest rate on the Term Loans was 5.80% per annum, which was based on a one-month Eurodollar rate of 1.80% per annum plus the applicable margin of 4.00% per annum for Eurodollar rate loans.

Upon entering into the term loan facility, the Company incurred debt issuance costs of \$7,811, which were initially recorded as a reduction of the debt liability and are being amortized to interest expense using the effective interest method from the issuance date of the Term Loan until the maturity date. The Company made principal payments of \$3,000 under the term loan facility during each of the years ended December 31, 2020, 2019 and 2018. Interest expense, including the amortization of debt issuance costs, totaled \$16,493, \$19,728 and \$19,146 for the years ended December 31, 2020, 2019 and 2018, respectively.

The revolving credit facility also requires payment of quarterly commitment fees at a rate of 0.25% per annum on the difference between committed amounts and amounts actually borrowed under the facility and customary letter of credit fees. For the years ended December 31, 2020, 2019 and 2018, interest expense related to the fee for the unused amount of the revolving credit facility totaled \$52, \$59 and \$62, respectively.

The Term Loans mature on December 20, 2023, and the revolving credit facility matures on December 20, 2021. The Term Loans are subject to amortization in equal quarterly installments, which commenced on March 31, 2017, of principal in an annual aggregate amount equal to 1.0% of the original principal amount of the Term Loans of \$300,000, with the remaining outstanding balance payable at the date of maturity.

Voluntary prepayments of principal amounts outstanding under the term loan facility are permitted at any time; however, if a prepayment of principal is made with respect to a Eurodollar loan on a date other than the last day of the applicable interest period, the Company is required to compensate the lenders for any funding losses and expenses incurred as a result of the prepayment. Prior to the revolving credit facility maturity date, funds borrowed under the revolving credit facility may be borrowed, repaid and reborrowed, without premium or penalty.

In addition, the Company is required to make mandatory prepayments under the facilities with respect to (i) 100% of the net cash proceeds from certain asset dispositions (including casualty and condemnation events) by the Company or certain of its subsidiaries, subject to certain exceptions and reinvestment provisions, (ii) 100% of the net cash proceeds from the issuance or incurrence of any additional debt by the Company or certain of its subsidiaries, subject to certain exceptions, and (iii) 50% of the Company's excess cash flow, as defined in the credit agreement, subject to reduction upon its achievement of specified performance targets. In accordance with these provisions, a mandatory prepayment of \$6.8 million will be required, no later than May 5, 2021. This amount has been included in the current portion of long-term debt, net of unamortized debt issuance costs on the consolidated balance sheet as of December 31, 2020.

The facilities are secured by, among other things, a first priority security interest, subject to permitted liens, in substantially all of the Company's assets and all of the assets of certain of its subsidiaries and a pledge of certain of the stock of certain of its subsidiaries, in each case subject to specified exceptions. The facilities contain customary affirmative and negative covenants, including certain restrictions on the Company's ability to pay dividends, and, with respect to the revolving credit facility, a financial covenant requiring the Company to maintain a specified total net leverage ratio in the event that on the last day of any fiscal quarter the Company has utilized more than 30% of its borrowing capacity under the facility. The Company was in compliance with all covenants as of December 31, 2020. As of December 31, 2019, the Company's net leverage ratio exceeded the maximum; however, as the Company's utilization of the revolving credit facility did not exceed the 30% testing threshold on December 31, 2019, the Company was not in default of the revolving credit facility as a result of the Company's net leverage ratio exceeding the maximum permitted amount. The Company was in compliance with all other applicable covenants of the facilities as of December 31, 2019.

Commercial Mortgage Loan

On July 1, 2015, the Company entered into a commercial mortgage loan agreement in the amount of \$7,950 (the "Mortgage Loan"). Borrowings under the Mortgage Loan bore interest at a rate of 3.5% per annum and were repayable in 60 monthly installments of \$46, consisting of principal and interest based on a 20-year amortization schedule. The remaining amount of unpaid principal under the Mortgage Loan was paid on the maturity date of July 1, 2020 utilizing the Company's revolving credit facility. Upon entering into the Mortgage Loan, the Company incurred debt issuance costs of \$45, which the Company initially recorded as a direct deduction from the debt liability and amortized to interest expense using the effective interest method from issuance date of the loan until the maturity date.

The Company made principal payments under the Mortgage Loan of \$6,644, \$314 and \$303 during the years ended December 31, 2020, 2019 and 2018, respectively. Interest expense, including the amortization of debt issuance costs, totaled \$120, \$249 and \$260 for the years ended December 31, 2020, 2019 and 2018, respectively.

12. Stockholders' Equity

In December 2017, the Company closed its initial public offering ("IPO") of 6,900 shares of its common stock at an offering price of \$13.00 per share, including 900 shares pursuant to the underwriters' option to purchase additional shares of the Company's common stock. The Company received net proceeds of \$79,327, after deducting underwriting discounts and commissions of \$6,279 and offering costs of \$4,094. Upon the closing of the IPO, all 4,038 shares of the Company's then-outstanding preferred stock automatically converted on a ten-for-one basis into an aggregate of 40,382 shares of the Company's common stock. Upon conversion of the preferred stock, the Company reclassified \$97,439 from temporary equity to additional paid-in capital and \$40 from temporary equity to common stock.

On April 30, 2018, the Company closed its follow-on public offering in which certain stockholders sold 7,350 shares of the Company's common stock at a price of \$25.00 per share, before deducting underwriting discounts and commissions (the "follow-on offering"). The Company did not sell any common stock in the follow-on offering and did not receive any of the proceeds from the sale of the Company's common stock by the selling stockholders. In connection with the sale of the Company's common stock in the follow-on offering, certain of the selling stockholders disgorged \$3,770 of profits recognized from the sale, after deducting \$41 of offering costs, to the Company in accordance with Section 16(b) of the Securities Exchange Act of 1934, as amended, which was recorded as an increase in additional paid-in capital. The Company incurred \$856 of transaction costs in connection with the follow-on offering, of which \$815 was recorded in selling, general and administrative expenses in the accompanying consolidated statements of operations.

Special Dividends to Holders of Common and Preferred Stock

The board of directors, on five separate occasions, declared a special dividend to the holders of common stock and preferred stock of record at that time. The below table details the cash dividends declared to stockholders of each share type for each of the five special dividends, as well as the amount of dividends the Company paid in each of the years ended December 31, 2020, 2019 and 2018, respectively:

Dividend Declaration Date	Cash Dividend Declared per Share Type		Dividends Paid During the Year Ended		
	Common	Series B and Series C Convertible Preferred	December 31, 2020	December 31, 2019	December 31, 2018
November 30, 2017	\$ 0.5802	\$ 5.8020	\$ —	\$ —	\$ 865
May 10, 2017	1.1774	11.7744	—	—	—
December 27, 2016	2.3306	23.3058	—	—	—
June 17, 2016	0.5891	5.8910	—	—	—
November 30, 2014	0.3835	3.8346	—	—	—
Total dividends paid			\$ —	\$ —	\$ 865

No dividend payments were payable as of December 31, 2020 and December 31, 2019. In connection with these special dividends, the board of directors also approved cash payments to be made to holders of the Company's stock options, SARs and restricted stock units ("RSUs") as equitable adjustments to the holders of such instruments in accordance with the provisions of the Company's equity incentive plans. These equitable adjustment payments are equal to an amount per share multiplied by the net number of shares subject to outstanding equity awards after applying the treasury stock method. The below table provides details of these equitable adjustment payments:

Dividend Declaration Dates	Equitable Adjustment per share	Year of Final Vesting	Equitable Adjustment Payments During the Year Ended			Equitable Adjustment Liability(1)	
			December 31, 2020	December 31, 2019	December 31, 2018	As of December 31, 2020	As of December 31, 2019
November 30, 2017	\$ 0.5802	2021	\$ 148	\$ 426	\$ 1,132	\$ 30	\$ 177
May 10, 2017	1.1774	2021	178	618	1,492	31	182
December 27, 2016	2.3306	2020	303	1,286	3,105	2	335
June 17, 2016	0.5891	2020	54	259	684	—	37
November 30, 2014	0.3835	2018	—	1	43	—	—
Total			\$ 683	\$ 2,590	\$ 6,456	\$ 63	\$ 731

(1) Net of estimated forfeitures. Amounts are included in accrued expenses and other current liabilities in the accompanying consolidated balance sheets.

13. Stock-based Compensation

2003 Stock Incentive Plan

The Company's 2003 Stock Incentive Plan, as amended (the "2003 Plan"), provided for the grant of qualified incentive stock options, nonqualified stock options, restricted stock or other stock-based awards to the Company's employees, officers, directors, advisers and outside consultants. The number of shares authorized for grant under the 2003 Plan was 32,500 shares. The 2003 Plan was administered by the board of directors, or at the discretion of the board of directors, by a committee of the board or by one or more executive officers of the Company. The exercise prices, vesting and other restrictions were determined at the discretion of the board of directors, or a committee of the board or one or more executive officers of the Company, if so delegated.

The 2003 Plan was terminated in August 2011, and the remaining 2,140 shares available for issuance under the plan at that time were transferred to the Company's 2011 Stock Incentive Plan (the "2011 Plan"). The shares of common stock underlying any awards that are forfeited, canceled, repurchased or are otherwise terminated by the Company under the 2003 Plan will be added back to the shares of common stock available for issuance under the Company's 2017 Stock Incentive Plan (the "2017 Plan").

2011 Stock Incentive Plan

The 2011 Plan provided for the Company to sell or issue common stock or restricted common stock, or to grant qualified incentive stock options, nonqualified stock options, SARs, RSUs or other stock-based awards to the Company's employees, officers, directors, advisers and outside consultants. The 2011 Plan was administered by the board of directors, or at the discretion of the board of directors, by a committee of the board. The exercise prices, vesting and other restrictions were determined at the discretion of the board of directors, or a committee of the board, if so delegated, except that the exercise price per share of stock options could not be less than 100% of the fair market value of common stock on the date of grant and the term of the stock option could not be greater than ten years. The stock options generally vest over a four-year period and expire ten years from the date of grant. Certain options provide for accelerated vesting if there is a change in control (as defined in the stock option agreements).

The 2011 Plan was terminated for the purpose of making new grants in December 2017, and the remaining 2,855 shares available for issuance under the 2011 Plan at that time were transferred to the 2017 Plan. Awards outstanding under the 2011 Plan at the time of the 2011 Plan's termination will continue to be governed by their existing terms. The shares of common stock underlying any awards that are forfeited, canceled, repurchased or otherwise terminated by the Company under the 2011 Plan will be added back to the shares of common stock available for issuance under the 2017 Plan.

2017 Stock Incentive Plan

On November 17, 2017, the Company's board of directors adopted, and on November 30, 2017, the Company's stockholders approved, the 2017 Plan, which became effective immediately prior to the effectiveness of the registration statement for the IPO. The 2017 Plan provides for the grant of incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock awards, restricted stock units and other stock-based awards. The number of shares initially reserved for issuance under the 2017 Plan was the sum of 7,161 shares, plus the number of shares (up to 18,746 shares) equal to the sum of (i) the number of shares remaining available for issuance under the 2003 Plan and 2011 Plan upon the effectiveness of the 2017 Plan and (ii) the number of shares of common stock subject to outstanding awards under the 2003 Plan and 2011 Plan that expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right. The number of shares of common stock that may be issued under the 2017 Plan will automatically increase on each January 1, beginning with the fiscal year ending December 31, 2019 and continuing for each fiscal year until, and including, the fiscal year ending December 31, 2027, equal to the least of (i) 20,000 shares, (ii) 4% of the outstanding shares of common stock on such date and (iii) an amount determined by the Company's board of directors. The shares of common stock underlying any awards that are forfeited, canceled, repurchased or otherwise terminated by the Company under the 2017 Plan will be added back to the shares of common stock available for issuance under the 2017 Plan. The total number of shares authorized for issuance under the 2017 Plan was 22,981 shares as of December 31, 2020, of which 10,647 shares remained available for future grant.

Upon the closing of the IPO on December 19, 2017, the Company filed a restated certificate of incorporation, which authorized the Company to issue 500,000 shares of \$0.001 par value common stock. Each share of common stock entitles the holder to one vote on all matters submitted to a vote of the Company's stockholders. Common stockholders are entitled to receive dividends, as may be declared by the board of directors, if any, subject to the preferential dividend rights of the preferred stock. Through December 31, 2020, except for the special cash dividends declared on November 30, 2014, June 17, 2016, December 21, 2016, May 10, 2017 and November 30, 2017 (see Note 12), no dividends have been declared by the board of directors.

As of December 31, 2020, the Company had reserved 22,981 shares of common stock for the exercise of outstanding stock options, the vesting of outstanding RSUs, and the number of shares remaining available for grant under the Company's 2017 Plan.

Stock Repurchase Program

On February 21, 2019, the Company announced a stock repurchase program authorizing it to repurchase up to \$75,000 of the Company's common stock. During the years ended December 31, 2020 and 2019, the Company repurchased 1,227 and 495 shares for \$3,031 and \$1,795, respectively, including commissions. As of December 31, 2020, \$70,208 remained authorized for repurchases of the Company's common stock under this stock repurchase program.

On August 14, 2018, the Company announced a stock repurchase program authorizing it to repurchase up to \$75,000 of the Company's common stock. During the year ended December 31, 2018, the Company repurchased and retired 5,172 shares for \$75,000, before commissions. Stock repurchases under this program are now complete.

Stock Option Valuation

Subsequent to the completion of the IPO, the Company uses the closing price of its common stock as reported on the Nasdaq Global Select Market on the applicable date of grant to determine the fair value of the shares of common stock underlying stock options.

The assumptions used in the Black-Scholes option-pricing model were as follows:

	Year Ended December 31,		
	2020	2019	2018
Risk-free interest rate	0.4%–0.7%	1.6%–2.5%	2.7%–3.0%
Expected term (in years)	6.1	6.1–6.2	6.0–6.2
Expected volatility	29.3%–31.9%	28.8%–30.6%	30.6%–32.6%
Expected dividend yield	0.0%	0.0%	0.0%

Stock Options

A summary of option activity under the 2003 Plan, the 2011 Plan and the 2017 Plan for the year ended December 31, 2020 is as follows:

	<u>Number of Shares</u>	<u>Weighted- Average Exercise Price</u>	<u>Weighted- Average Remaining Contractual Term (in years)</u>	<u>Aggregate Intrinsic Value</u>
Outstanding at January 1, 2020	8,250	\$ 7.73	5.65	\$ 4,235
Granted	166	4.55		
Exercised	(591)	2.02		
Forfeited	(705)	8.98		
Outstanding at December 31, 2020	<u>7,120</u>	\$ 8.01	4.88	\$ 9,367
Options exercisable at December 31, 2020	<u>6,492</u>	\$ 7.62	4.59	\$ 9,026
Vested or expected to vest at December 31, 2020	<u>7,090</u>	\$ 8.01	4.87	\$ 9,341

The weighted-average grant-date fair value of options granted during the years ended December 31, 2020, 2019 and 2018 was \$1.42, \$2.13 and \$7.59 per share, respectively. Cash proceeds received upon the exercise of options were \$1,195, \$2,687 and \$14,730 during the years ended December 31, 2020, 2019 and 2018, respectively. The intrinsic value of stock options exercised during the years ended December 31, 2020, 2019 and 2018 was \$1,746, \$6,970 and \$105,787, respectively. The aggregate intrinsic value is calculated as the difference between the exercise price of the stock options and the fair value of the Company's common stock for those stock options that had exercise prices lower than the fair value of the Company's common stock.

Restricted Stock Units

A summary of RSU activity for the year ended December 31, 2020 is as follows:

	<u>Number of Shares</u>	<u>Weighted- Average Grant Date Fair Value</u>	<u>Aggregate Fair Value</u>
Unvested balance at January 1, 2020	1,653	\$ 11.38	
Granted	3,270	3.54	
Vested	(554)	11.03	\$ 2,321
Forfeited	(138)	9.60	
Unvested balance at December 31, 2020	<u>4,231</u>	\$ 5.43	

The Company withheld 150, 77 and 1 shares of common stock in settlement of employee tax withholding obligations due upon the vesting of RSUs during the years ended December 31, 2020, 2019 and 2018, respectively.

Performance Based Restricted Stock Units

The Company granted 983 Performance-based Restricted Stock Units ("PSUs") in February 2020 to certain employees that vest over a three-year period based on the achievement of performance goals and continued performance of services. The performance goals consist solely of market-based vesting conditions, determined by the Company's level of achievement of pre-established parameters relating to the performance of the Company's stock price as set by the board of directors. Vesting may occur at any time during the three-year period. The actual number of shares earned upon vesting will range up to a maximum of 983 shares if all targets are achieved.

Compensation expense for PSUs is based on the estimated value of the awards on the grant date, and is recognized over the period from the grant date through the expected vest dates of each vesting condition, both of which were estimated based on a Monte Carlo simulation model applying the following key assumptions:

	Grant Date Assumptions
Risk-free interest rate	1.2%
Volatility	70.0%
Dividend yield	0.0%
Cost of equity	11.0%

A summary of PSU activity for the year ended December 31, 2020 is as follows:

	Number of Shares	Weighted-Average Grant Date Fair Value	Aggregate Fair Value
Unvested balance at January 1, 2020	—	\$ —	
Granted	983	3.22	
Vested	(246)	3.22	\$ 1,516
Forfeited	—	—	
Unvested balance at December 31, 2020	<u>737</u>	<u>\$ 3.22</u>	

Stock Appreciation Rights

On three occasions between 2012 and 2017, the Company granted SARs that allow the holder the right, upon exercise, to receive in cash the amount of the difference between the fair market value of the Company's common stock at the date of exercise and the price of the underlying common stock at the date of grant of each SAR. The SARs vested over a four-year period from the date of grant and expire ten years from the date of grant. As of December 31, 2020, 220 SARs were outstanding, vested and exercisable with a fair value of \$2.24 per SAR. The fair value of the SAR liability as of December 31, 2020 and 2019 was \$493 and \$264, respectively (see Note 7), and was included in accrued expenses and other current liabilities in the accompanying consolidated balance sheets.

Stock-Based Compensation Expense

The Company classified stock-based compensation expense related to stock options, RSUs and SARs for the years ended December 31, 2020, 2019 and 2018 in the consolidated statements of operations and comprehensive income (loss) as follows:

	Year Ended December 31,		
	2020	2019	2018
Cost of revenue	\$ 153	\$ 216	\$ 249
Research and development expenses	2,447	1,569	1,864
Selling, general and administrative	10,555	8,036	6,781
	<u>\$ 13,155</u>	<u>\$ 9,821</u>	<u>\$ 8,894</u>

The Company recognized stock-based compensation expense for the years ended December 31, 2020, 2019 and 2018 in the consolidated balance sheet as follows:

	Year Ended December 31,		
	2020	2019	2018
Change in fair value of SAR liability	\$ 229	\$ (1,123)	\$ (768)
Recognized as additional paid-in capital	12,926	10,944	9,662
Total stock-based compensation	<u>\$ 13,155</u>	<u>\$ 9,821</u>	<u>\$ 8,894</u>

As of December 31, 2020, there was \$20,948 of unrecognized compensation cost related to outstanding stock options, RSUs and SARs, which is expected to be recognized over a weighted-average period of 2.24 years.

14. Net Income (Loss) per Share

The Company calculated basic and diluted net income (loss) per share attributable to common stockholders as follows:

	Year Ended December 31,		
	2020	2019	2018
Numerator:			
Net income (loss) attributable to common stockholders, basic and diluted	\$ 24,801	\$ (48,206)	\$ 73,006
Denominator:			
Weighted-average shares used to compute net income (loss) per share attributable to common stockholders, basic	83,465	83,853	83,539
Dilutive effect of stock options	1,050	—	8,086
Dilutive effect of restricted stock units	763	—	252
Weighted-average shares used to compute net income (loss) per share attributable to common stockholders, diluted	<u>85,278</u>	<u>83,853</u>	<u>91,877</u>
Net income (loss) per share attributable to common stockholders:			
Basic	<u>\$ 0.30</u>	<u>\$ (0.57)</u>	<u>\$ 0.87</u>
Diluted	<u>\$ 0.29</u>	<u>\$ (0.57)</u>	<u>\$ 0.79</u>

The Company excluded the following potential common shares, presented based on amounts outstanding at each period end, from the computation of diluted net income (loss) per share attributable to common stockholders for the periods presented because including them would have been anti-dilutive:

	Year Ended December 31,		
	2020	2019	2018
Options to purchase common stock	4,119	4,641	2,213
Unvested restricted stock units	1,030	1,516	168
Unvested performance-based stock units	983	—	—

15. Revenue from Contracts with Customers

Disaggregation of revenue

The Company disaggregates its revenue by product and service in the consolidated statements of operations and comprehensive income (loss). The Company recognizes performance obligations related to product revenue at a point in time, and performance obligations related to service revenue over time. The Company also disaggregates its revenue based on geographic locations of its customers, as determined by the customer's shipping address, summarized as follows:

	Year Ended December 31,		
	2020	2019	2018
North America:			
United States	\$ 127,217	\$ 103,451	\$ 104,124
Canada	38,960	36,466	41,884
Total North America	166,177	139,917	146,008
Latin America	34,926	24,043	32,283
Europe, Middle East and Africa:			
Germany	5,487	13,773	45,864
Other	30,446	24,381	35,479
Total Europe, Middle East and Africa	35,933	38,154	81,343
Asia-Pacific			
Australia	116,661	42,218	24,354
Other	39,549	37,965	13,139
Total Asia-Pacific	156,210	80,183	37,493
Total revenue(1)	\$ 393,246	\$ 282,297	\$ 297,127

(1) Other than the United States, Canada, Germany and Australia, no individual countries represented 10% or more of the Company's total revenue for any of the periods presented.

The Company also disaggregates its revenue based on product line summarized as follows:

	Year Ended December 31,		
	2020	2019	2018
Product revenue:			
Wireless	\$ 111,255	\$ 58,234	\$ 402
Fixed telco	96,904	38,734	—
Cable	137,924	144,409	256,587
Total product revenue	346,083	241,377	256,989
Service revenue			
Wireless	7,348	1,701	250
Fixed telco	1,924	773	—
Cable	37,891	38,446	39,888
Total service revenue	47,163	40,920	40,138
Total revenue	\$ 393,246	\$ 282,297	\$ 297,127

Costs to Obtain or Fulfill a Contract

As of December 31, 2020 and 2019 and January 1, 2019, the Company had short-term capitalized contract costs of \$95, \$585 and \$209, respectively, which are included in prepaid expenses and other current assets and had long-term capitalized contract costs of \$70, \$70 and \$128, respectively, which are included in other assets in the accompanying consolidated balance sheets. During the year ended December 31, 2020 and 2019, amortization expense associated with capitalized contract costs was \$568 and \$695, respectively, which the Company recorded to selling, general and administrative expenses in the accompanying consolidated statements of operations and comprehensive income (loss).

Contract Balances

Contract liabilities consist of deferred revenue and include payments received in advance of performance under the contract. The Company recognizes such amounts as revenue when the Company satisfies its performance obligations. For the year ended December 31, 2020, the Company recognized \$23,048 of revenue that was included in deferred revenue as of December 31, 2019. For the year ended December 31, 2019, the Company recognized \$22,273 of revenue which was included in deferred revenue as of January 1, 2019.

The Company receives payments from customers based upon contractual billing terms. The Company records accounts receivable when the right to consideration becomes unconditional. Contract assets include amounts related to the Company's contractual right to consideration for both completed and partially completed performance obligations that may not have been invoiced. As of December 31, 2020 and 2019 and January 1, 2019, the Company recorded contract assets of \$771, \$50 and \$28, respectively, which is netted with deferred revenue in the accompanying consolidated balance sheets.

Transaction price allocated to the remaining performance obligations

As of December 31, 2020, the aggregate remaining amount of revenue expected to be recognized related to unsatisfied or partially unsatisfied performance obligations is \$19,051, which consists of deferred revenue. The Company expects approximately 82% of this amount to be recognized in the next twelve months with the remaining amounts to be recognized over the next two to five years.

16. Segment Information

The Company operates as one operating segment. Operating segments are defined as components of an enterprise for which separate financial information is regularly evaluated by the Company's chief operating decision maker, or decision-making group, in deciding how to allocate resources and assess performance. The Company has determined that its chief operating decision maker is its President and Chief Executive Officer. The Company's chief operating decision maker reviews the Company's financial information on a consolidated basis for purposes of allocating resources and assessing financial performance. Since the Company operates as one operating segment, all required financial segment information can be found in these consolidated financial statements.

Please refer to Note 15 for the Company's revenue by geography for the years ended December 31, 2020, 2019 and 2018.

The Company's property and equipment, net by location was as follows:

	December 31,	
	2020	2019
United States	\$ 20,988	\$ 25,583
China	2,986	3,277
Australia	2,849	4,041
Other	2,057	3,009
Total property and equipment, net	<u>\$ 28,880</u>	<u>\$ 35,910</u>

17. Related Parties

Transactions Involving Liberty Global Ventures Holding B.V. and its Affiliates

Liberty Global Ventures Holding B.V. was a principal stockholder of the Company through its ownership of common stock. Affiliates of Liberty Global Ventures Holding B.V. ("Liberty Global Affiliates") are customers of the Company. Liberty Global Affiliates ceased being a principal stockholder as of October 19, 2018, when it disposed of a portion of its ownership of the Company's stock. During the year ended December 31, 2018, the Company recognized revenue of \$22,252 from transactions with Liberty Global Affiliates and amounts received in cash from Liberty Global Affiliates totaled \$30,432.

Employment of Rongke Xie

Rongke Xie, who serves as Deputy General Manager of Guangzhou Casa Communication Technology LTD ("Casa China"), a subsidiary of the Company, is the sister of Lucy Xie, the Company's Senior Vice President of Operations and a member of the Company's board of directors. Casa China paid Rongke Xie \$187, \$117 and \$143 in total compensation in the years ended December 31, 2020, 2019 and 2018, respectively, for her services as an employee.

In addition, during the years ended December 31, 2020 and 2019, the Company granted to Rongke Xie 90 and 8 RSUs, respectively, which vest in annual installments over a four-year period. The grant-date fair value of the awards totaled \$200 and \$100, respectively, which will be recorded as stock-based compensation expense over the vesting period of the awards. During the years ended December 31, 2020 and 2019, the Company recognized selling, general and administrative expenses of \$90 and \$46 related to these awards, respectively.

18. Commitments and Contingencies

Operating Leases

The Company leases manufacturing, warehouse and office space in the United States, China, Hong Kong, Spain and Australia under non-cancelable operating leases that expire through 2024. The Company also has a lease in Ireland that expires in 2026. Rent expense for the years ended December 31, 2020, 2019 and 2018 was \$3,252, \$2,459 and \$1,029, respectively. The Company records rent expense on a straight-line basis, and, as a result, as of December 31, 2020 and 2019, the Company had a deferred rent liability of \$90 and \$212, respectively, which is included in accrued expenses and other current liabilities in the accompanying consolidated balance sheets.

Future minimum lease payments under non-cancelable operating leases as of December 31, 2020 were as follows:

<u>Year Ending December 31,</u>		
2021	\$	2,533
2022		1,500
2023		1,425
2024		536
2025		445
Thereafter		334
	<u>\$</u>	<u>6,773</u>

Indemnification

The Company has, in the ordinary course of business, agreed to defend and indemnify certain customers against third-party claims asserting infringement of certain intellectual property rights, which may include patents, copyrights, trademarks or trade secrets.

As permitted under Delaware law, the Company indemnifies its officers, directors and employees for certain events or occurrences that happen by reason of their relationship with or position held at the Company.

As of December 31, 2020 and 2019, the Company had not experienced any losses related to these indemnification obligations and no material claims were outstanding where a contingent loss was considered to be probable or reasonably estimable. The Company does not expect significant claims related to these indemnification obligations and, consequently, concluded that the fair value of these obligations is negligible, and no related liabilities were recorded in its consolidated financial statements.

Litigation

On May 29, 2019, John Shen filed a putative shareholder class action complaint in the Massachusetts Superior Court of Essex County, *John Shen v Casa Systems, Inc et al.*, Civil Action No 1977VB00787 against the Company, certain of its current and former executive officers and directors, Summit Partners, the Company's largest investor, and the underwriters from the Company's December 15, 2017 IPO (collectively, the "defendants"). On July 3, 2019, Mirza R. Baig filed a similar putative shareholder class action complaint in the Massachusetts Superior Court of Essex County, *Mirza R. Baig v. Casa Systems, Inc, et al.*, Civil Action No. 1977CV00961, against the defendants. Pursuant to plaintiffs' motion filed on July 26, 2019, and accepted September 3, 2019, the two matters were consolidated and transferred to Business Litigation Session of the Massachusetts Superior Court, Suffolk County, *John Shen v. Casa Systems, Inc. et al.*, Civil Action No. 19-CV-03203-BLS2 and *Mirza R. Baig v. Casa Systems, Inc., Civil Action No. 19-CV-03204-BLS2*. The complaints purported to be brought on behalf of all purchasers of the Company's common stock in and/or traceable to the IPO. The complaints generally alleged that (i) each of the defendants violated Section 11 and/or Section 12(a)(2) of the Securities Act of 1933, as amended, (the "Securities Act"), because documents related to the IPO, including the Company's registration statement and prospectus were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to

make such statements not misleading and (ii) the individual defendants and Summit Partners acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 12, 2019, the plaintiffs filed an amended shareholder class action complaint, purportedly on behalf of all purchasers of the Company's common stock in and/or traceable to the IPO, which contained substantially similar allegations and asserted the same claims as the two initial complaints, described above. Plaintiffs sought, among other things, compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, and equitable and injunctive relief. On January 14, 2020, the defendants filed motions to dismiss the amended complaint, with prejudices. On January 11, 2021, the court granted the motions to dismiss.

On August 9, 2019, Donald Hook filed a putative shareholder class action lawsuit in the Supreme Court of the State of New York, County of New York, *Donald Hook et al., v. Casa Systems, Inc. et al.*, Index No. 654548/2019, against the same defendants named in the Shen and Baig matters. The complaint purports to be brought on behalf of all purchasers of the Company's common stock in and/or traceable to the IPO and generally alleges that (i) each of the defendants violated Section 11 and/or Section 12(a)(2) of the Securities Act because documents related to the IPO including the Company's registration statement and prospectus were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to make such statements not misleading and (ii) the individual defendants and Summit Partners acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 22, 2019, the plaintiff filed an amended complaint, which contains substantially similar allegations as the initial complaint, described above, and asserts claims for violations of Sections 11 and 15 of the Securities Act. The plaintiff seeks, among other things, compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, disgorgement, and equitable and injunctive relief. On January 21, 2020, the defendants served motions to dismiss the amended complaint, which remain pending.

On August 13, 2019, Panther Partners, Inc. filed a putative shareholder class action lawsuit in the Supreme Court of the State of New York, New York County, *Panther Partners, Inc., et al., v. Jerry Guo, et al.*, Index No. 654585/2019, against the Company, certain of its current and former executive officers and directors, and the underwriters from the Company's April 30, 2018 follow-on offering of common stock, (the "Follow-on Offering"). The complaint purports to be brought on behalf of all purchasers of the Company's common stock in the Follow-on Offering and generally alleges that (i) each of the defendants, other than Abraham Pucheril, violated Section 11 of the Securities Act, and each of the defendants violated Section 12(a)(2) of the Securities Act, because documents related to the Company's Follow-on Offering, including the Company's registration statement and prospectus, were materially misleading by containing untrue statements of material fact and/or omitting to state material facts necessary to make such statements not misleading and (ii) the individual defendants acted as controlling persons within the meaning and in violation of Section 15 of the Securities Act. On November 22, 2019, the plaintiff filed an amended complaint, which contains substantially similar allegations and asserts the same claims as the initial complaint, described above. The plaintiff seeks, among other things, compensatory damages, costs and expenses, including counsel and expert fees, rescission or a rescissory measure of damages, and equitable and injunctive relief. On January 21, 2020, the defendants served motions to dismiss the amended complaint, which remain pending.

The Company is generally obligated to indemnify our officers, directors, and the IPO and Follow-on Offering underwriters in each of the matters described above.

No amounts have been accrued for any of the putative class action lawsuits referenced above as of December 31, 2020 as the Company does not believe the likelihood of a material loss is probable. Although the ultimate outcome of these matters cannot be predicted with certainty, the resolution of this matter could have a material impact on the Company's results of operations in the period in which such matter is resolved.

19. Employee Benefit Plan

The Company has a Section 401(k) defined contribution savings plan for its employees. The plan covers substantially all employees in the United States who meet minimum age and service requirements and allows participants to defer a portion of their annual compensation on a pre-tax basis, subject to certain limitations. Company contributions to the plan may be made at the discretion of the board of directors. Effective January 1, 2014, the Company commenced matching contributions in the amount of 50% of the employee's contributions of up to 6% of eligible wages. The Company made matching contributions to the plan of \$1,523, \$1,762 and \$1,630 in the years ended December 31, 2020, 2019 and 2018, respectively.

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 Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a- 15(e) and 15d- 15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act), as of the end of the period covered by this Annual Report on Form 10-K. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Securities and Exchange Commission’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure. Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and our management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of the end of the period covered by this Annual Report on Form 10-K, our principal executive officer and principal financial officer have concluded that as of such date, our disclosure controls and procedures were effective.

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rule 13a-15(f) or 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the company’s principal executive and principal financial officers and effected by the company’s board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and,
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company’s assets that could have a material effect on the financial statements.

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

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2020. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated 2013 Framework. Based on this assessment, our management concluded that, as of December 31, 2020, our internal control over financial reporting is effective based on those criteria.

This Annual Report on Form 10-K does not include an attestation report of our independent registered public accounting firm due to a transition period established by rules of the SEC for “emerging growth companies”.

Changes in Internal Control over Financial Reporting

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

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The complete response to this Item regarding the backgrounds of our executive officers and directors and other information required by Items 401, 405 and 407 of Regulation S-K is expected to be incorporated by reference herein to our definitive proxy statement for our 2021 Annual Meeting of Stockholders.

Code of Business Conduct and Ethics

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

Item 11. Executive Compensation

The information required by this Item is expected to be incorporated by reference herein to our definitive proxy statement for our 2021 Annual Meeting of Stockholders.

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

The information required by this Item is expected to be incorporated by reference herein to our definitive proxy statement for our 2021 Annual Meeting of Stockholders.

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

The information required by this Item is expected to be incorporated by reference herein to our definitive proxy statement for our 2021 Annual Meeting of Stockholders.

Item 14. Principal Accounting Fees and Services

The information required by this Item is expected to be incorporated by reference herein to our definitive proxy statement for our 2021 Annual Meeting of Stockholders.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(1) Financial Statements

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

(2) Financial Statement Schedules

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

(3) Exhibits

Exhibit Number	Description of Exhibit	Incorporated by Reference			Filed Herewith
		Form	File No.	Date of Filing	
2.1	Deed, dated as of February 21, 2019, between Casa Systems, Inc. and NetComm Wireless Limited	8-K	001-38324	2/21/2019	10.1
3.1	Restated Certificate of Incorporation of the Registrant	8-K	001-38324	12/19/2017	3.1
3.2	By-laws of the Registrant	8-K	001-38324	12/19/2017	3.2
4.1	Specimen Stock Certificate evidencing the shares of common stock	S-1/A	333-221658	12/4/2017	4.1
4.2	Description of Securities of the Registrant	10-K	001-38324	2/27/2020	4.2
10.1#	Form of Indemnification Agreement between the Registrant and its executive officers and directors	S-1	333-221658	11/17/2017	10.1
10.2#	2011 Stock Incentive Plan, as amended	S-1	333-221658	11/17/2017	10.6
10.3#	Form of Incentive Stock Option Agreement under 2011 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.7
10.4#	Form of Nonstatutory Stock Option Agreement under 2011 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.8
10.5#	Form of Restricted Stock Agreement under 2011 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.9
10.6#	Form of Restricted Stock Unit Agreement under 2011 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.10
10.7#	Form of Stock Appreciation Rights Agreement under 2011 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.11
10.8#	2017 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.12
10.9#	Form of Stock Option Agreement under 2017 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.13
10.10#	Form of Restricted Stock Unit Agreement under 2017 Stock Incentive Plan	S-1	333-221658	11/17/2017	10.14
10.11	Registration Rights Agreement, dated April 26, 2010, between the Registrant and the investors party thereto	S-1	333-221658	11/17/2017	10.19
10.12	Credit Agreement, dated as of December 20, 2016, by and among the Registrant and JPMorgan Chase Bank, N.A., as agent, and the other agents, arrangers and lenders party thereto	S-1	333-221658	11/17/2017	10.20

10.13	Letters, dated as of February 1, 2017 and April 14, 2017, from the Registrant to the lenders party to the Credit Agreement	S-1	333-221658	11/17/2017	10.21	
10.14	Security Agreement, dated as of December 20, 2016, by and among the Registrant, each of the subsidiaries of the Registrant party thereto, and JPMorgan Chase Bank, N.A., as Collateral Agent	S-1	333-221658	11/17/2017	10.22	
10.15#	Employment Agreement, dated November 17, 2017, by and between the Registrant and Jerry Guo	S-1	333-221658	11/17/2017	10.24	
10.16#	Employment Agreement, dated November 17, 2017, by and between the Registrant and Lucy Xie	S-1	333-221658	11/17/2017	10.25	
10.17#	Employment Agreement, dated November 17, 2017, by and between the Registrant and Weidong Chen	S-1	333-221658	11/17/2017	10.26	
10.18#	Offer Letter, dated October 10, 2017, by and between the Registrant and Scott Bruckner	10-K	001-38324	2/27/2020	10.28	
10.19	Form of Performance Restricted Stock Unit Agreement with Full Acceleration under 2017 Stock Incentive Plan	10-Q	001-38324	5/1/2020	10.2	
10.20	Form of Performance Restricted Stock Unit Agreement with Partial Acceleration under 2017 Stock Incentive Plan	10-Q	001-38324	5/1/2020	10.3	
10.21	Lease annexure "A", dated October 29, 2020, between ESR Investment Nominees 3 (Australia) Pty Limited and NetComm Wireless Pty Ltd	10-Q	001-38324	10/29/2020	10.2	
21.1	Subsidiaries of the Registrant					✓
23.1	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm					✓
23.2	Consent of Pricewaterhouse Coopers LLP, Independent Registered Public Accounting Firm					✓
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					✓
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					✓
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					

- 101.INS Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
- 101.SCH Inline XBRL Taxonomy Extension Schema Document
- 101.CAL Inline XBRL Taxonomy Extension Calculation Linkbase Document
- 101.DEF Inline XBRL Taxonomy Extension Definition Linkbase Document
- 101.LAB Inline XBRL Taxonomy Extension Label Linkbase Document
- 101.PRE Inline XBRL Taxonomy Extension Presentation Linkbase Document
- 104 Cover Page Interactive Data File (formatted as inline XBRL with applicable taxonomy extension information contained in Exhibits 101)

Management contracts or compensatory plans or arrangements required to be filed as an exhibit hereto pursuant to Item 15(b) of Form 10-K.

* Furnished herewith.

Item 16. Form 10-K Summary.

Not applicable.

Subsidiaries of Casa Systems, Inc.

<u>Name of Subsidiary</u>	<u>Jurisdiction of Incorporation or Organization</u>
Casa Communications Limited	Ireland
Casa Communications Technology S.L.	Spain
Casa Properties LLC	Delaware
Casa Systems B.V.	Netherlands
Casa Systems Canada Ltd.	Quebec, Canada
Casa Systems SAS	France
Casa Systems Securities Corporation	Massachusetts
Guangzhou Casa Communications Ltd.	China (PRC)
Casa Communications SAS	Colombia
Casa Technologies Limited	Hong Kong
Casa Technologies Pty Ltd.	Australia
Casa Communications Holdings Pty Ltd.	Australia
NetComm Wireless Limited Pty Ltd.	Australia
NetComm Wireless Limited (NZ)	New Zealand
NetComm Wireless Limited Canada	Canada
NetComm Wireless Limited (UK)	United Kingdom
NetComm Wireless Inc.	United States of America
NetComm Germany	Germany

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statement (Form S-8 No. 333-222073) pertaining to the 2003 Stock Incentive Plan, the 2011 Stock Incentive Plan, and the 2017 Stock Incentive Plan of Casa Systems, Inc. of our report dated February 25, 2021, with respect to the consolidated financial statements of Casa Systems, Inc., included in this Annual Report (Form 10-K) for the year ended December 31, 2020.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 25, 2021

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-222073) of Casa Systems, Inc. of our report dated February 27, 2020, except for the presentation of disaggregated revenue discussed in Note 15, as to which the date is February 25, 2021, relating to the financial statements, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 25, 2021

**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 on Form 10-K of Casa Systems, Inc. (the "Company") for the period ended December 31, 2020, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Scott Bruckner, as Chief Financial Officer of the Company, hereby certify, as of the date hereof, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge, the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company at the dates and for the periods indicated.

Date: February 25, 2021

By: _____ /s/ Scott Bruckner
Scott Bruckner
Chief Financial Officer