



2022 Annual Report

**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, 2022

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

Commission File No. 000-25826

HARMONIC INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

77-0201147
(I.R.S. Employer
Identification No.)

**2590 Orchard Parkway
San Jose, CA 95131
(408) 542-2500**

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

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

<u>Title of each class</u>	<u>Trading Symbol</u>	<u>Name of each exchange on which registered</u>
Common Stock, par value \$0.001 per share	HLIT	The NASDAQ Global Select Market

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post 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	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

Indicate by check mark whether the registrant 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. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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

Based on the reported closing sale price of the Common Stock on The NASDAQ Global Select Market on July 1, 2022, the aggregate market value of the voting Common Stock held by non-affiliates of the registrant was approximately \$398.6 million. Shares of Common Stock held by each executive officer and director and by each person who owns 5% or more of the outstanding Common Stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of February 22, 2023, there were 111,070,678 shares of the Registrant's Common Stock, \$0.001 par value, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the Registrant's 2023 Annual Meeting of Stockholders (which will be filed with the Securities and Exchange Commission within 120 days of the end of the fiscal year ended December 31, 2022) are incorporated by reference in Part III of this Annual Report on Form 10-K.

HARMONIC INC.
FORM 10-K
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Forward Looking Statements

Some of the statements contained in this Annual Report on Form 10-K are forward-looking statements that involve risk and uncertainties. The statements contained in this Annual Report on Form 10-K that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), including, without limitation, statements regarding our expectations, beliefs, intentions or strategies regarding the future. In some cases, you can identify forward-looking statements by terminology such as, “may,” “will,” “should,” “expects,” “plans,” “anticipates,” “could,” “believes,” “intends,” “estimates,” “predicts,” “potential,” or “continue” or the negative of these terms or other comparable terminology. These forward-looking statements include, but are not limited to, statements regarding:

- developing trends and demands in the markets we address, particularly emerging markets;
- macroeconomic conditions, including inflation, rising interest rates, global supply chain disruptions, volatile capital markets and foreign currency fluctuations, particularly in certain geographies, and in financial markets;
- the impact of geopolitical events, including the Russia-Ukraine conflict and rising tensions between China and Taiwan and the United States, on our business and the markets in which we operate;
- new and future products and services;
- spending of our customers;
- our strategic direction, future business plans and growth strategy;
- industry and customer consolidation;
- expected demand for and benefits of our products and services;
- concentration of revenue sources;
- expectations regarding our Broadband and Video solutions;
- the impact of the COVID-19 pandemic, and related responses of businesses and governments to the pandemic, on our operations and personnel, on commercial activity in the markets in which we operate and worldwide and regional economies, and on our results of operations;
- potential future acquisitions and dispositions;
- anticipated results of potential or actual litigation;
- our competitive environment;
- the impact of our restructuring plans;
- the impact of governmental regulations, including with respect to tariffs and economic sanctions;
- anticipated revenue and expenses, including the sources of such revenue and expenses;
- expected impacts of changes in accounting rules;
- expectations regarding the usability of our inventory and the risk that inventory will exceed forecasted demand;
- expectations and estimates related to goodwill and intangible assets and their associated carrying value; and
- use of cash, cash needs and ability to raise capital, including repaying our Notes (as defined below) or repurchasing our common stock.

These statements are subject to known and unknown risks, uncertainties and other factors, any of which may cause our actual results to differ materially from those implied by the forward-looking statements. Important factors that may cause actual results to differ from expectations include those discussed in “Risk Factors” in this Annual Report on Form 10-K. All forward-looking statements included in this Annual Report on Form 10-K are based on information available to us on the date thereof, and we assume no obligation to update any such forward-looking statements. The terms “Harmonic,” “Company,” “we,” “us,” “its,” and “our,” as used in this Annual Report on Form 10-K, refer to Harmonic Inc. and its subsidiaries and its predecessors as a combined entity, except where the context requires otherwise.

Risk Factor Summary

Our business is subject to significant risks and uncertainties that make an investment in us speculative and risky. Below we summarize what we believe are the principal risk factors but these risks are not the only ones we face, and you should carefully review and consider the full discussion of our risk factors in the section titled “Risk Factors,” together with the other information in this Annual Report on Form 10-K. If any of the following risks actually occurs (or if any of those listed elsewhere in this Annual Report on Form 10-K occur), our business, reputation, financial condition, results of operations, revenue, and future prospects could be seriously harmed. In that event, the market price of our common stock could decline, and you could lose part or all of your investment. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that adversely affect our business.

- We depend on cable, satellite and telecommunications (“telco”), and broadcast and media industry spending for our revenue and any material decrease or delay in spending in any of these industries would negatively impact our operating results, financial condition and cash flows;
- The loss of one or more of our key customers, a failure to continue diversifying our customer base, or a decrease in the number of larger transactions could harm our business and our operating results;
- We need to develop and introduce new and enhanced products and solutions in a timely manner to meet the needs of our customers and to remain competitive;
- The markets in which we operate are intensely competitive;
- Our future growth depends on a number of video and broadband industry trends;
- Our software-based broadband product initiatives expose us to certain technology transition risks that may adversely impact our operating results, financial condition and cash flows;
- Our operating results are likely to fluctuate significantly and, as a result, may fail to meet or exceed the expectations of securities analysts or investors, causing our stock price to decline;
- We purchase several key components, subassemblies and modules used in the manufacture or integration of our products from sole or limited sources, and we rely on contract manufacturers and other subcontractors;
- We face risks associated with having outsourced engineering resources located in Ukraine; and
- We rely on resellers, value-added resellers and systems integrators for a significant portion of our revenue, and disruptions to, or our failure to develop and manage our relationships with these customers or the processes and procedures that support them could adversely affect our business.

PART I

Item 1. BUSINESS

We are a leading global provider of (i) versatile and high performance video delivery software, products, system solutions and services that enable our customers to efficiently create, prepare, store, playout and deliver a full range of high-quality broadcast and streaming video services to consumer devices, including televisions, personal computers, laptops, tablets and smart phones and (ii) broadband access solutions that enable broadband operators to more efficiently and effectively deploy high-speed internet, for data, voice and video services to consumers' homes.

We operate in two segments, Video and Broadband. During the third quarter of fiscal 2022, the Company's Cable Access segment was renamed the Broadband segment to reflect a broader strategic view of the category. There has been no change to the composition of the segment; therefore, no prior periods were restated. Our Video business provides video processing and production and playout solutions and services worldwide to broadband operators and satellite and telco Pay-TV service providers, which we refer to collectively as "service providers," and to broadcast and media companies, including streaming media companies. Our Video business infrastructure solutions are delivered either through shipment of our products, software licenses or as software-as-a-service ("SaaS") subscriptions. Our Broadband business provides broadband access solutions and related services, including our CableOS software-based broadband access solution to broadband operators globally.

Across our two business segments, we derived approximately 73% of our revenue from the Americas in 2022. The Europe, Middle East and Africa (EMEA) and Asia Pacific (APAC) regions accounted for 21% and 6% of our 2022 revenue, respectively.

Harmonic was initially incorporated in California in June 1988 and was reincorporated in Delaware in May 1995. Our principal executive offices are currently located at 2590 Orchard Parkway, San Jose, California 95131. Our telephone number is (408) 542-2500. Our Internet website is <http://www.harmonicinc.com>. Other than the information expressly set forth in this Annual Report on Form 10-K, the information contained or referred to on our website is not part of this report.

Industry Overview and Market Trends

Video Business

We believe our customers must continue to employ innovative technologies and services to address key trends in the dynamic video industry.

- *Demand for Streaming Services.* In the highly competitive video industry, there is strong demand for video content to be captured, processed and streamed to millions of subscribers at scale, and with personalized service features and characteristics. We believe video streaming is, and will continue to be, the most significant trend affecting the video industry for the foreseeable future.
- *Demand for Targeted Advertising.* Streaming technology makes it possible for streaming platforms to insert personalized targeted advertisements into video streams to consumers. This capability is highly sought after by advertisers and results in significantly higher advertising revenue for video streaming service providers. With streaming viewership continuing to grow rapidly, we believe targeted ad insertion will become a foundational pillar of the video industry in the coming years.
- *Streaming of Live Events.* In contrast to the constraints of traditional linear broadcast channels, there is effectively no limit to the number of live events that can be streamed or the audience reach of streamed events. Consequently, we believe the number of live events globally that will be streamed to consumers, especially live sporting events, will continue to grow for the foreseeable future.
- *Demand for High Quality Video.* High quality video for both traditional broadcast television and streaming continues to be an important factor for consumers. Compression technologies such as High Efficiency Video Compression (HEVC) or advances in H.264/AVC codecs, as well as increasing requirements for HDR encoding, will continue to remain a high priority for both broadcast and streaming providers.

- *Decline in Broadcast Viewing.* Broadcast television viewership will continue to decline as the growth in streaming accelerates. We believe this transition will cause traditional Pay-TV service providers and broadcasters to focus their investments on (i) providing streaming services and (ii) reducing the operational complexities and cost of broadcast television.

In response to these trends, our customers are:

- expanding their streaming offerings with video-on-demand (VOD) programming, live events and/or linear TV bundles to reach a larger and more global audience;
- utilizing streaming technologies to expand monetization opportunities with personalized and targeted ad insertion;
- continuing to enhance and differentiate their content offerings, consolidate to achieve greater economies of scale and subscriber concentration, and acquire other companies to expand their content libraries and capabilities to develop original content; and
- improving the efficiency and utilization of legacy infrastructure to minimize operational and staffing needs and costs by migrating services to public cloud SaaS or upgrading on-premise equipment with the latest generation of highly dense and functionally rich technologies.

Our Video business strategy is focused on providing our customers with software-based appliances and SaaS platforms to enable and support these trends.

Our Video Markets

Broadcast and Media Companies

- Network broadcasters, programmers and content owners continue to invest in new and enhanced direct-to-consumer streaming platforms, as well as upgrade and improve the efficiencies of their traditional broadcast television services. We believe these companies will utilize new technologies, including public cloud infrastructure and SaaS platforms, to expand their streaming offerings, reach wider audiences, and increase monetization opportunities through personalized advertising, and, in parallel, reduce the complexity and cost of running and operating their traditional broadcast services.

Streaming

- We believe media companies of all sizes will invest heavily in streaming services for the foreseeable future, whether for linear TV, live events or a range of VOD offerings, and that these offerings will be enhanced to include personal and targeted advertisements to increase monetization potential. We believe many of these streaming offerings will be launched by new entrants into the space, in addition to those launched by traditional media companies who have a history and brand in broadcast television.

Service Providers

- *Wireline Operators.* Cable and telco operators continue to focus on various initiatives to improve and differentiate their service offerings from competing service providers, including bundled digital video, voice and high-speed data services; expansion of streaming service offerings to include linear TV, live events and VOD; upgraded consumer-facing applications; and capacity enhancement of high-speed data services.
- *Satellite Operators.* Satellite operators around the world have established digital television services that serve tens of millions of subscribers, with the ability to provide tens of thousands of linear channels. We expect satellite operators to increase their investments in their streaming offerings to meet rapidly changing consumption habits and, in parallel, strive to optimize their traditional broadcast operations.

Video Infrastructure Technology Trends

- *Acceleration of Streaming Services.* We believe the industry will continue to adopt streaming technologies at an accelerating pace to deliver video content to consumers and, increasingly, utilize public clouds to do so.

- *Transformation of Broadcast Infrastructure.* We believe the industry will continue to seek to transform existing broadcast infrastructure workflows into more flexible and efficient operations, in order to reduce operational and investment costs. We believe that, in order to maximize cost savings, a material portion of these operations will migrate to public clouds in the coming years, while some customers will upgrade and replace their aging on-premise equipment with next-generation software-based appliances that significantly reduce operational complexity.

Broadband Business

Industry Challenges

Broadband operators continue to face challenges from the rapid growth of demand for broadband bandwidth in their networks, driven primarily by:

- more users with more connected devices and applications;
- bundled digital video, voice and high-speed data services; and
- bandwidth-intensive VOD and streaming video services, and interactive cloud applications.

In addition, the operation of network infrastructure is space, power and personnel intensive. Hardware-centric networks can also be expensive to update or replace. To remain competitive, especially in the face of heightened competition from non-cable service providers such as telcos to deliver gigabit data rates, broadband operators need to significantly upgrade existing equipment and network technologies.

Technology Trends

- *DOCSIS.* We believe the cable industry will continue to deploy the DOCSIS 3.1 standard, which enables high bandwidth data transfer over existing broadband infrastructure, and we expect future adoption and deployment of the next-generation DOCSIS 4.0 standard.
- *Virtualization.* We believe broadband operators will continue to move toward more software-driven architectures, which is central to our Broadband business and product strategy. Virtualized software solutions that are decoupled from underlying hardware and run on commercial-off-the-shelf (COTS) servers and/or cloud-native architectures allow for significantly increased efficiencies, upgradability, configuration flexibility, service agility and scalability not feasible with hardware-centric approaches. We believe a software-based broadband access solution can significantly reduce broadband operator facility costs, especially costs related to physical space and power consumption, and increase operational efficiency, and that the deployment of these systems will be an important step in broadband operators' transition to all-IP networks.
- *Distributed Access Architecture.* In addition to centralized broadband access solutions, we believe interest in distributed access solutions continues to accelerate, particularly in competitive gigabit service markets where broadband operators are competing with fiber-to-the-home (FTTH) services and are extending fiber networks deeper into their access networks. A distributed access architecture (DAA) coupled with a software-based broadband access solution running on COTS servers at a headend, and the distribution of DAA nodes closer to end users, alleviates the power and space requirements of centralized systems at headend sites due to the fact that the radio frequency (RF) processing is distributed into the field outside of the headend. We believe this distributed architecture will enable service providers to efficiently scale to support data and IP video growth.
- *Multiple Access.* CableOS is a software-based solution that runs on COTS servers connected to distributed access nodes. Traditionally, the distributed access nodes deliver service to the subscribers over RF signals with DOCSIS. With CableOS, FTTH services over passive optical networks (PON) can be supported with software running on the CableOS servers and with remote optical line termination (OLT) modules plugged into the DAA nodes. The result is that the CableOS solution can support delivering both DOCSIS and PON services to different subscribers, which we believe is another key differentiating competitive advantage for Harmonic. As fiber is pulled deeper into the network, broadband operators will have the infrastructure and technology to deliver both traditional cable services and FTTH.

Our Broadband business strategy is focused on providing our customers with software-based solutions, on a centralized, distributed access or hybrid architecture, to enable and support these technology and industry trends.

Our Products and Solutions

Video Processing and Delivery Solutions

We offer two categories of solutions - a broad range of software-based video appliances and SaaS platforms - to deliver broadcast and streaming services and capabilities in the media market.

Software-based Appliances. Our video processing appliances, which include network management and application software and hardware products, provide our customers with the ability to acquire a variety of signals from different sources and in different protocols in order to deliver a variety of real-time and stored content to their subscribers for viewing on a broad range of devices. Our appliance product families include:

- *Encoders.* Our high-performance encoders compress video, audio and data channels to low bit rates while maintaining high video quality. Our latest software-based XOS encoders can deliver video in multiple formats, including standard, HD and Ultra HD, and in any video compression standard, including MPEG-2, MPEG-4 AVC and HEVC. This capability allows the encoders to converge workflows targeted for all forms of video delivery, whether broadcast or streaming.
- *Video Servers.* Our Spectrum family of video server systems are used by broadcast and media companies to create play-to-air television channels. Our customers typically use these video server products to record incoming content from either live feeds or from tapes, encoding that content in real-time into standard media files that are then stored in the server's file system until the content is needed for playback as part of a scheduled playlist.
- *High-density stream processing.* We offer high-density, real-time stream processing systems capable of high-performance, high-throughput video processing for mission-critical IP video delivery applications, including multiplexing, scrambling, splicing and blackout source switching.
- *Edge processors.* Our family of Edge processing platforms allows service providers to acquire content delivered via satellite, IP or terrestrial networks for distribution to their subscribers. These products are used by broadcasters to decode signals backhauled from live news and sporting events in contribution applications, as well as by content owners looking to distribute their content in a controlled manner to a large base of affiliates.

SaaS platforms. Our VOS360 SaaS platforms provide both streaming and channel origination and distribution services in a public cloud environment that is fully managed and operated by our 24/7 DevOps teams. Our SaaS solutions enable the packaging and delivery of high-quality streaming services, including live streaming, VOD, catch-up TV, start-over TV, network-DVR and cloud-DVR services through HTTP streaming to any device, along with dynamic and personal ad insertion. In addition, our VOS360 SaaS platforms enable the transformation of traditional broadcast video workflows into cloud-based workflows, resulting in more efficient and leaner operations for our customers. We continue to see an increasing number of customers seeking to leverage the inherent commercial, operational and infrastructure flexibility offered by our VOS360 SaaS platforms. We also provide an on-premise SaaS offering with our VOS cloud-native software solution for customers seeking to deploy a cloud-like architecture in a private data center.

Broadband Products and Solutions

Software-Based Broadband Access Solution. As demand continues to rapidly grow for high-speed broadband services such as streaming, VOD, time-shift TV and cloud DVR, we believe we can help broadband operators take advantage of this opportunity with our CableOS software-based broadband access solution, an end-to-end solution consisting of virtualized cloud-native software elements that orchestrate and connect with a variety of Harmonic and third-party indoor and outdoor hardware devices. We believe our CableOS solution delivers unprecedented scalability, agility and cost savings, and enables our customers to migrate to multi-gigabit broadband capacity and the fast deployment of DOCSIS data, video and voice services. We believe our solution resolves space and power constraints in broadband operator facilities, significantly reduces dependence on hardware upgrade cycles, and reduces total cost of ownership. Our CableOS solution can be deployed based on a centralized, distributed access or hybrid architecture.

CableOS Central Cloud Services. Our CableOS Central Cloud Services is a value-add subscription service for CableOS customers that bundles three elements: (i) 24x7 technical support, (ii) a dedicated customer success team focused on customer satisfaction and retention, and (iii) a CableOS Central Suite SaaS that enhances and simplifies the deployment, monitoring, operation and maintenance of the CableOS solution.

Technical Support and Professional Services

We provide maintenance and support services to most of our customers under service level agreements that are generally renewed on an annual basis. We also provide consulting, implementation and integration services to our customers worldwide. We draw upon our expertise in broadcast television, communications networking, compression technology and broadband access technologies to design, integrate and install complete solutions for our customers, including integration with third-party products and services. We offer a broad range of services, including SaaS-related support and deployment, program management, technical design and planning, building and site preparation, integration and equipment installation, end-to-end system testing and comprehensive training.

Customers

We sell our products to a variety of cable, satellite and telco, and broadcast and media companies. Set forth below is a representative list of our significant end user and integrator/reseller customers, listed alphabetically, based, in part, on revenue during 2022.

United States

AT&T
Charter Communications
Comcast
Cox Communications
Deltatre
Heartland Video Systems
Intelsat
Mega Hertz
SES

International

America Movil
Groupe Canal
IISN Systems
Millicom
Netorium
NYL Electronica
Rogers Communications
Tele2 Sverige AB
Vodafone

Sales to our 10 largest customers in 2022, 2021 and 2020 accounted for approximately 67%, 58% and 51% of our net revenue, respectively. Although we continue to seek to broaden our customer base by penetrating new markets and further expanding internationally, we expect to see continuing industry consolidation and customer concentration.

During 2022, 2021 and 2020, Comcast accounted for 39%, 26% and 20% of our net revenue, respectively. The loss of any significant customer, or any material reduction in orders from any significant customer, or our failure to qualify our new products with any significant customer could materially and adversely affect our operating results, financial condition and cash flows. In addition, we are involved in most quarters in one or more relatively large individual transactions. A decrease in the number of relatively larger individual transactions in which we are involved in any quarter could adversely affect our operating results for that quarter.

Sales and Marketing

In the United States and internationally, we sell our products through our own direct sales force, as well as through independent resellers and systems integrators. Our direct sales team is organized geographically and by major customers and markets to support customer requirements. Our principal sales offices outside of the United States are located in Europe and Asia, and we have support staff in Switzerland and France to support our international customers and operations. Our international resellers are generally responsible for importing our products and providing certain installation, technical support and other services to customers in their territory after receiving training from us.

Our direct sales force and resellers are supported by a highly trained technical staff, which includes application engineers who work closely with our customers to develop technical proposals and design systems to optimize system performance and economic benefits for our customers. Our technical support teams provide a customized set of services, as required, for ongoing maintenance, support-on-demand and training for our customers and resellers, both in our facilities and on-site.

Our product management organization develops strategies for product lines and markets and, in conjunction with our sales force, identifies the evolving technical and application needs of customers so that our product development resources can be most effectively and efficiently deployed to meet anticipated product requirements. Our product management organization is also responsible for setting price levels, demand forecasting and general support of the sales force, particularly at major accounts.

Our corporate marketing organization is responsible for building awareness of the Harmonic brand in our markets and driving engagement with our strategies, solutions and products. The group develops all of our corporate messaging and manages all customer and industry communication channels, including public relations, web and social media, events and trade shows, as well as demand generation marketing campaigns in conjunction with our sales force.

Manufacturing and Suppliers

We rely on third-party contract manufacturers to assemble our products and the subassemblies and modules for our products. In 2003, we entered into an agreement with Plexus Services Corp. (“Plexus”) to act as our primary contract manufacturer. Plexus accounts for the majority of the products we purchase from our contract manufacturers. This agreement has automatic annual renewals, unless prior notice for nonrenewal is given, and has been automatically renewed for a term expiring in October 2023. We do not generally maintain long-term agreements with any of our contract manufacturers.

Many components, subassemblies and modules necessary for the manufacture or integration of our products are obtained from a sole supplier or a limited group of suppliers. While we expend considerable efforts to qualify additional component sources, consolidation of suppliers in the industry and the small number of viable alternatives have limited the results of these efforts. We do not generally maintain long-term agreements with any of our suppliers.

Intellectual Property

As of December 31, 2022, we held 121 issued U.S. patents and 49 issued foreign patents and had 56 patent applications pending. Our issued patents are scheduled to expire between 2023 and 2041. Although we attempt to protect our intellectual property rights through patents, trademarks, copyrights, licensing arrangements, maintaining certain technology as trade secrets and other measures, we cannot assure you that any patent, trademark, copyright or other intellectual property rights owned by us will not be invalidated, circumvented or challenged, that such intellectual property rights will provide competitive advantages to us, or that any of our pending or future patent applications will be issued with the claims, or the scope of the claims, sought by us, if at all. We cannot assure you that others will not develop technologies that are similar or superior to our technology, duplicate our technology or design around the patents that we own. In addition, effective patent, copyright and trade secret protection may be unavailable or limited in which we do business or may do business in the future.

We enter into confidentiality or license agreements with our employees, consultants, vendors and customers as needed, and generally limit access to, and distribution of, our proprietary information. However, no assurances can be given that these actions will prevent misappropriation of our technology. In addition, if necessary, we are prepared to take legal action, in the future, to enforce our patents and other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others, or to defend against claims of infringement or invalidity. Any such litigation could result in substantial costs and diversion of resources, including management time, and could negatively affect our business, operating results, financial position and cash flows.

In order to successfully develop and market our products, we may be required to enter into technology development or licensing agreements with third parties. Although many companies are often willing to enter into such technology development or licensing agreements, we cannot assure you that such agreements can be negotiated on reasonable terms or at all. The failure to enter into technology development or licensing agreements, when necessary, could limit our ability to develop and market new products and could harm our business.

Backlog

We schedule production of our products and solutions based upon our backlog, open contracts, informal commitments from customers and sales projections. Our backlog consists of unfilled firm purchase orders by our customers which have not been completed. Approximately 80% of our backlog and deferred revenue is projected to be converted to revenue within a rolling one-year period. As of December 31, 2022 and 2021, we had backlog, including deferred revenue, of \$457.1 million and \$441.0 million, respectively. Delivery schedules on such orders may be deferred or canceled for a number of reasons, including reductions in spending by our customers or changes in specific customer requirements. In addition, due to annual budget cycles at many of our customers, the amount of our backlog at any given time is not necessarily indicative of actual revenues for any succeeding period.

Competition

The markets in which our Video and Broadband businesses operate are extremely competitive and have been characterized by rapid technological change and declining average selling prices in the past. The principal competitive factors in these markets include product performance, functionality and features, reliability, pricing, breadth of product offerings, brand recognition and awareness, sales and distribution capabilities, technical operations, support and services, and customer relationships with our customers. We believe that we compete favorably in each of these categories.

Our competitors in our Video appliance business are primarily comprised of providers of video delivery and video processing and compression products and solutions, broadcast equipment and solutions providers, and certain network infrastructure providers. Our competitors in our Video SaaS business include companies that offer video delivery and processing SaaS solutions, SaaS video streaming platform providers, and certain public cloud service providers.

Our competitors in our Broadband business include a number of suppliers of networking and communications equipment and solutions to broadband service providers.

Research and Development

We have historically devoted a significant amount of our resources to research and development. Research and development expenses in 2022, 2021 and 2020 were approximately \$120.3 million, \$102.2 million and \$82.5 million, respectively. Research and development expenses as a percentage of revenue in 2022, 2021 and 2020 were approximately 19%, 20% and 22%, respectively. Our internal research and development activities are conducted primarily in the United States (California, Oregon and New Jersey), France, Israel and Hong Kong. In addition, a portion of our research and development is conducted through third-party partners with engineering resources in Ukraine and India.

Our research and development program is primarily focused on developing new products and solutions, and adding new features and other improvements to existing products and solutions. Our development strategy is to identify features and capabilities in our core software appliances and SaaS platforms that are, or are expected to be, needed by our customers. For our Video business segment, our current research and development efforts are focused on enhancing our streaming capabilities, expanding our targeted advertising technologies, and improving the efficiency and flexibility of broadcast workflows for our traditional appliances and within our SaaS platform. With respect to our Broadband business segment, our major research and development efforts are focused on broadband access solutions for both video and data, particularly the ongoing development of our centralized, distributed and hybrid CableOS software-based broadband access solutions.

Our success in designing, developing, manufacturing and selling new or enhanced products and solutions will depend on a variety of factors, including the identification of market demand for new products and solutions, product selection, timely product design and development, product performance, effective manufacturing and assembly processes, and sales and marketing. Because of the complexity inherent in such research and development efforts, we cannot assure you that we will successfully develop new products and solutions, or that new products and solutions developed by us will achieve market acceptance. Our failure to successfully develop and introduce new products and solutions would materially and adversely affect our business, operating results, financial condition and cash flows.

Human Capital Resources

As of December 31, 2022, we employed a total of 1,340 full time employees, including 565 in research and development, 203 in sales, 300 in service and support, 54 in operations, 57 in marketing (corporate and product) and 161 in a general and administrative capacity. Of those employees, 430 were located in the United States and Canada, and 910 employees were located outside of North America in 23 countries in Central and South America, the Middle East and Africa, Europe and the Asia Pacific region. From time to time, we also employ a number of temporary employees and consultants on a contract basis. Our employees in each of France and Spain are represented by labor unions and an employee works council. None of our other employees are represented by a labor union with respect to their employment with us. We have not experienced any work stoppages, and we consider our relations with our employees to be good.

Competition for qualified personnel in the technology space is intense, and we believe that our future success largely depends upon our continued ability to attract, develop and retain highly skilled individuals across the globe. We believe we offer competitive compensation (including salary, incentive bonus and equity awards) and comprehensive benefits packages in each of our locations around the globe. We aim to create an environment in which our employees can develop and grow, and be recognized for their achievements. We offer training, development and on-demand learning programs to support continuous learning and cultivate talent throughout the company, and promote opportunities for internal mobility and recruitment across functions and geographies. We offer rewards and recognition programs, including spot awards to recognize employee contributions, patent incentive awards, and various functional recognition awards. We regularly conduct employee surveys to gauge employee engagement and satisfaction, and we use the views expressed in the surveys to influence our people strategy and policies.

As a global company, much of our success is rooted in the diversity of our teams and our commitment to inclusion, where all employees are respected regardless of gender, race, color, national origin, ancestry, citizenship, religion, age, physical or mental disability, medical condition, genetic information, pregnancy, sexual orientation, gender identity or gender expression, veteran status, or marital status. We are focused on understanding our diversity, equity and inclusion (DEI) opportunities and executing on a strategy to support further progress. We support regional employee-led groups that promote and drive various volunteering initiatives aimed at assisting underrepresented and disadvantaged populations in the communities where we operate, as well as internal awareness and educational campaigns on DEI-related topics. We continue to focus on building a pipeline for talent to create more opportunities for workplace gender and other diversity and to support greater representation within the company.

Available Information

Our website is located at www.harmonicinc.com, and our investor relations website is located at investor.harmonicinc.com. Copies of the Company's Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act are available free of charge on our investor relations website as soon as reasonably practicable after we file such material electronically with or furnish it to the Securities and Exchange Commission (the SEC). The SEC also maintains a website that contains our SEC filings at www.sec.gov.

We announce material information to the public about us, our products and services and other matters through a variety of means, including filings with the SEC, press releases, public conference calls, webcasts, and our investor relations web site (investor.harmonicinc.com) in order to achieve broad, non-exclusionary distribution of information to the public and for complying with our disclosure obligations under Regulation FD. Except as expressly set forth in this Annual Report on Form 10-K, the contents of our web site are not incorporated by reference into, or otherwise to be regarded as part of, this report or in any other report or document we file with the SEC, and any references to our websites are intended to be inactive textual references only.

Item 1A. RISK FACTORS

Risks Related to Our Business and Our Industry

We depend on cable, satellite and telco, and broadcast and media industry spending for our revenue and any material decrease or delay in spending in any of these industries would negatively impact our operating results, financial condition and cash flows.

Our revenue has been derived from worldwide sales to service providers and broadcast and media companies, as well as, in recent years, streaming media companies. We expect that these markets will provide our revenue for the foreseeable future. Demand for our products and solutions will depend on the magnitude and timing of spending by customers in each of these markets for the purpose of creating, expanding or upgrading their systems. These spending patterns are dependent on a variety of factors, including:

- the impact of general economic conditions, actual and projected, including inflation, rising interest rates, lower consumer confidence, volatile capital markets, supply chain disruptions and the impact of the Russia-Ukraine conflict, and government and business responses thereto, on the global economy and regional economies;
- access to financing;
- annual budget cycles of customers in each of the industries we serve;
- the impact of industry consolidation;
- customers suspending, reducing or shifting spending due to: (i) new video or broadband industry standards; (ii) industry trends and technology shifts, such as virtualization and cloud-based solutions, and (iii) new products and solutions, such as products and services based on our VOS software platform or our CableOS software-based broadband access solutions;
- delayed or reduced near-term spending as customers transition away from video appliance solutions and adopt new business and operating models enabled by software and cloud-based solutions, including SaaS unified video processing solutions;
- federal, state, local and foreign government regulation of telecommunications, television broadcasting and streaming media;
- overall demand for communication services and consumer acceptance of new video and data technologies and services;
- competitive pressures, including pricing pressures;
- the impact of fluctuations in currency exchange rates, such as the strengthening of the U.S. dollar; and
- discretionary end-user customer spending patterns.

In the past, specific factors contributing to reduced spending have included:

- uncertainty and deteriorated market conditions regionally and globally due to the COVID-19 pandemic;
- weak or uncertain economic and financial conditions in the United States or one or more international markets;
- uncertainty related to development of industry technology;
- delays in evaluations of new services, new standards and systems architectures by certain customers;
- emphasis by certain of our customers on generating revenue from existing subscribers or end-customers, rather than from new subscribers or end-customers, through construction, expansion or upgrades;
- a reduction in the amount of capital available to finance projects of our customers and potential customers;
- proposed and completed business combinations and divestitures by our customers and the length of regulatory review of each;
- completion of a new system or significant expansion or upgrade to a system; and
- bankruptcies and financial restructuring of major customers.

In the past, adverse economic conditions in one or more of the geographies in which we offer our products have adversely affected our customers' spending in those geographies and, as a result, our business. During challenging economic times, due to the COVID-19 pandemic, Russia-Ukraine conflict and related inflationary pressure, and in tight credit markets, many customers have delayed and reduced and may continue to delay or reduce capital expenditures. This has resulted and could continue to result in reductions in revenue from our products, longer sales cycles, difficulties in collection of accounts receivable, slower adoption of new technologies and increased price competition. If global economic and market conditions, or economic conditions in the United States, Europe or other key markets, remain uncertain or deteriorate, we could experience a material and adverse effect on our business, results of operations, financial condition and cash flows. Additionally, since most of our international revenue is denominated in U.S. dollars, global economic and market conditions may impact currency exchange rates and cause our products to become relatively more expensive to customers in a particular country or region, which could lead to delayed or reduced spending in those countries or regions, thereby negatively impacting our business and financial condition.

In addition, industry consolidation has in the past constrained, and may in the future constrain or delay, spending by our customers. Further, if our product portfolio and product development plans do not position us well to capture an increased portion of the spending of customers in the markets on which we focus, our revenue may decline.

As a result of these various factors and potential issues related to customer spending, we may not be able to maintain or increase our revenue in the future, and our operating results, financial condition and cash flows could be materially and adversely affected.

The loss of one or more of our key customers, a failure to continue diversifying our customer base, or a decrease in the number of larger transactions could harm our business and our operating results.

Historically, a significant portion of our revenue has been derived from relatively few customers, due in part to the consolidation of media customers. Sales to our top 10 customers in the fiscal years ended December 31, 2022, 2021 and 2020 accounted for approximately 67%, 58% and 51% of our net revenue, respectively. Although we continue to seek to broaden our customer base by penetrating new markets and further expanding internationally, we expect to see continuing industry consolidation and customer concentration.

In the fiscal years ended December 31, 2022, 2021 and 2020, Comcast accounted for 39%, 26% and 20% of our net revenue, respectively. Further consolidation in the cable industry could lead to additional revenue concentration for us. The loss of any significant customer, or any material reduction in orders from any other significant customer, or our failure to qualify our new products with any significant customer could materially and adversely affect, either long term or in a particular quarter, our operating results, financial condition and cash flows. Further, while Comcast's election to license our CableOS software contains commitments in license fees to us, if Comcast deploys our solutions more slowly or at a scale that is lower than we anticipate, our operating results, financial condition and cash flows could be materially and adversely effected.

In addition, in most quarters, we are involved in one or more relatively large individual transactions. A decrease in the number of the relatively larger individual transactions in which we are involved in any quarter could materially and adversely affect our operating results for that quarter.

As a result of these and other factors, we may be unable to increase our revenues from some or all of the markets we address, or to do so profitably, and any failure to increase revenues and profits from these customers could materially and adversely affect our operating results, financial condition and cash flows.

We need to develop and introduce new and enhanced products and solutions in a timely manner to meet the needs of our customers and to remain competitive.

All of the markets we address are characterized by continuing technological advancement, changes in customer requirements and evolving industry standards. To compete successfully, we must continually design, develop, manufacture and sell new or enhanced products and solutions that provide increasingly higher levels of performance and reliability and meet our customers' changing needs. However, we may not be successful in those efforts if, among other things, our products and solutions:

- are not cost effective;
- are not brought to market in a timely manner;
- are not in accordance with evolving industry standards;
- fail to meet market acceptance or customer requirements; or
- are ahead of the needs of their markets.

If new standards or some of our new products are adopted later than we predict or not adopted at all, or if adoption occurs earlier than we are able to deliver the applicable products or functionality, we risk spending significant research and development time and dollars on products or features that may never achieve market acceptance or that miss the customer demand window and thus do not produce the revenue that a timely introduction would have likely produced.

If we fail to develop and market new and enhanced products and solutions on a timely basis, our operating results, financial condition and cash flows could be materially and adversely affected.

The markets in which we operate are intensely competitive.

The markets for our products are extremely competitive and have been characterized by rapid technological change and declining average sales prices in the past.

Our competitors in our Video appliance business are primarily comprised of providers of video delivery and video processing and compression products and solutions, broadcast equipment and solutions providers, and certain network infrastructure providers. Our competitors in our Video SaaS business include companies that offer video delivery and processing SaaS solutions, SaaS video streaming platform providers, and certain public cloud service providers. Our competitors in our Broadband business include a number of suppliers of networking and communications equipment and solutions to broadband service providers.

A number of our principal business competitors in both of our business segments are substantially larger and/or may have access to greater financial, technical, marketing or other resources than we have. Consolidation in the Video industry has led to the acquisition of a number of our historic competitors over the last several years by private equity firms and by AWS. With respect to our Broadband business, certain competitors are substantially larger than us.

In addition, some of our larger competitors may have more long-standing and established relationships with certain domestic and foreign customers. Many of these large enterprises are in a better position to withstand any significant reduction in spending by customers in our markets and may be better able to navigate periods of market uncertainty, such as the uncertainty caused by the COVID-19 pandemic, Russia-Ukraine conflict and inflation. They often have broader product lines and market focus, and may not be as susceptible to downturns in a particular market. These competitors may also be able to bundle their products together to meet the needs of a particular customer, and may be capable of delivering more complete solutions than we are able to provide. To the extent large enterprises that currently do not compete directly with us choose to enter our markets by acquisition or otherwise, competition would likely intensify.

Further, some of our competitors have offered, and in the future may offer, their products at lower prices than we offer for our competing products or on more attractive financing or payment terms, which has in the past caused, and may in the future cause, us to lose sales opportunities and the resulting revenue or to reduce our prices in response to that competition. Also, some competitors that are smaller than us have engaged in, and may continue to engage in, aggressive price competition in order to gain customer traction and market share. Reductions in prices for any of our products could materially and adversely affect our operating margins and revenue.

Additionally, certain customers and potential customers have developed, and may continue to develop, their own solutions that may cause such customers or potential customers to not consider our product offerings or to displace our installed products with their own solutions. The growing availability of open source codecs and related software, as well as new server chipsets that incorporate encoding technology, has, in certain respects, lowered the barriers to entry for the video processing industry. The development of solutions by potential and existing customers and the reduction of the barriers to entry to enter the video processing industry could result in increased competition and adversely affect our results of operations and business.

If any of our competitors' products or technologies were to become the industry standard, our business could be seriously harmed. If our competitors are successful in bringing their products to market earlier than us, or if these products are more technologically capable than ours, our revenue could be materially and adversely affected.

Our future growth depends on a number of video and broadband industry trends.

Technology, industry and regulatory trends and requirements may affect the growth of our business. These trends and requirements include the following:

- convergence, whereby network operators bundle video, voice and data services to consumers, including mobile delivery options;
- continued strong consumer demand for streaming video services;
- continued adoption of public cloud SaaS platforms to stream video content to consumers, as well as for broadcast infrastructure workflows;

- continued growth in targeted advertising as a key revenue source for video streaming service providers;
- the pace of adoption and deployment of high-bandwidth technology, such as DOCSIS 3.x, DOCSIS 4.0, next generation LTE and fiber-to-the-premises (“FTTP”);
- the use of digital video by businesses, governments and educational institutions globally;
- efforts by regulators and governments in the United States and internationally to encourage the adoption of broadband and digital technologies, including 5G broadband networks, as well as to regulate broadband access and delivery;
- the need to develop partnerships with other companies involved in video infrastructure workflow and broadband services;
- the extent and nature of regulatory attitudes towards issues such as network neutrality, competition between operators, access by third parties to networks of other operators, local franchising requirements for telcos to offer video, and other new services, such as mobile video; and
- the outcome of disputes and negotiations between content owners and service providers regarding rights of service providers to store and distribute recorded broadcast content, which outcomes may drive adoption of one technology over another in some cases.

If we fail to recognize and respond to these trends, by timely developing products, features and services required by these trends, we are likely to lose revenue opportunities and our operating results, financial condition and cash flows could be materially and adversely affected.

Our software-based broadband access product initiatives expose us to certain technology transition risks that may adversely impact our operating results, financial condition and cash flows.

We believe our CableOS software-based broadband access solutions, supporting centralized, DAA or hybrid configurations, will significantly reduce broadband operator headend costs and increase operational efficiency, and are an important step in operators’ transition to all-IP networks. If we are unsuccessful in continuing to innovate and develop and deploy our broadband access solutions in a timely manner, or are otherwise delayed in making our solutions available to our customers, our business may be adversely impacted, particularly if our competitors develop and market similar or superior products and solutions.

We believe our software-based broadband access solutions will continue to replace and make obsolete current CMTS solutions, which is a market our products have historically not addressed, as well as cable edge-QAM products. If demand for our software-based broadband access solutions is weaker than expected, our near and long-term operating results, financial condition and cash flows could be adversely impacted. Moreover, if competitors adapt new broadband industry technology standards into competing broadband access solutions faster than we do, or promulgate a new or competitive architecture for next-generation broadband access solutions that renders our CableOS solution obsolete, our business may be adversely impacted.

The sales cycle for our CableOS solutions tends to be long. For broadband operators, upgrading or expanding network infrastructure is complex and expensive, and investing in a CableOS solution is a significant strategic decision that may require considerable time to evaluate, test and qualify. Potential customers need to ensure our CableOS solution will interoperate with the various components of its existing network infrastructure, including third-party equipment, servers and software. In addition, since we are a relatively new entrant into the CMTS market, we need to demonstrate significant performance, functionality and/or cost advantages with our CableOS solutions that outweigh customer switching costs. If sales cycles are significantly longer than anticipated or we are otherwise unsuccessful in growing our CableOS sales, our operating results, financial condition and cash flows could be materially and adversely affected.

Our operating results are likely to fluctuate significantly and, as a result, may fail to meet or exceed the expectations of securities analysts or investors, causing our stock price to decline.

Our operating results have fluctuated in the past and are likely to continue to fluctuate in the future, on an annual and a quarterly basis, as a result of several factors, many of which are outside of our control. Some of the factors that may cause these fluctuations include:

- the level and timing of spending of our customers in the United States, Europe and in other markets;

- economic and financial conditions specific to each of the cable, satellite and telco, and broadcast and media industries, as well as general economic and financial market conditions, including the global economic impacts caused by the COVID-19 pandemic, the Russia-Ukraine conflict, rising tensions between China and Taiwan and China and the United States, inflation and government and business responses thereto as well as related supply chain and labor shortage issues;
- changes in market acceptance of and demand for our products or our customers' services or products;
- the timing and amount of orders, especially from large individual transactions and transactions with our significant customers;
- the mix of our products sold and the effect it has on gross margins;
- the timing of revenue recognition, including revenue recognition on sales arrangements and from transactions with significant service and support components, which may span several quarters;
- our transition to a SaaS subscription model for our Video business, which may cause near-term declines in revenue in our Video segment since, unlike Video appliance sales, SaaS revenue is recognized over the applicable subscription term based on service usage;
- the timing of completion of our customers' projects;
- the length of each customer product upgrade cycle and the volume of purchases during the cycle;
- competitive market conditions, including pricing actions by our competitors;
- the level and mix of our domestic and international revenue;
- new product introductions by our competitors or by us;
- uncertainty in the European Union due to unrest or violence in Ukraine that the ongoing military conflict with the Russian Federation have caused, which could adversely affect our results, financial condition and prospects;
- changes in domestic and international regulatory environments affecting our business;
- the evaluation of new services, new standards and system architectures by our customers;
- the cost and timely availability to us of components, subassemblies and modules;
- the mix of our customer base, by industry and size, and sales channels;
- changes in our operating and extraordinary expenses;
- the timing of acquisitions and dispositions by us and the financial impact of such transactions;
- impairment of our goodwill and intangibles;
- the impact of litigation, such as related litigation expenses and settlement costs;
- write-downs of inventory and investments;
- changes in our effective federal tax rate, including as a result of changes in our valuation allowance against our deferred tax assets, and changes in our effective state tax rates, including as a result of apportionment;
- changes to tax rules related to the deferral of foreign earnings and compliance with foreign tax rules;
- the impact of applicable accounting guidance on accounting for uncertainty in income taxes that requires us to establish reserves for uncertain tax positions and accrue potential tax penalties and interest; and
- the impact of applicable accounting guidance on business combinations that requires us to record charges for certain acquisition related costs and expenses and generally to expense restructuring costs associated with a business combination subsequent to the acquisition date.

The timing of deployment of our products by our customers can be subject to a number of other risks, including the availability of skilled engineering and technical personnel, the availability of third-party equipment and services, our customers' ability to negotiate and enter into rights agreements with video content owners that provide our customers with the right to deliver certain video content, and our customers' need for local franchise and licensing approvals.

We often recognize a substantial portion of our quarterly revenue in the last month of the quarter. We establish our expenditure levels for product development and other operating expenses based on projected revenue levels for a specified period, and expenses are relatively fixed in the short term. Accordingly, even small variations in the timing of revenue, particularly from relatively large individual transactions, can cause significant fluctuations in operating results in a particular quarter.

As a result of these factors and other factors, our operating results in one or more future periods may fail to meet or exceed the expectations of securities analysts or investors. In that event, the trading price of our common stock would likely decline.

We purchase several key components, subassemblies and modules used in the manufacture or integration of our products from sole or limited sources, and we rely on contract manufacturers and other subcontractors.

Our reliance on sole or limited suppliers, particularly foreign suppliers, and our reliance on contractors for manufacturing and installation of our products, involves several risks, including a potential inability to obtain an adequate supply of required components, subassemblies or modules; reduced control over costs, quality and timely delivery of components, subassemblies or modules; supplier discontinuation of components, subassemblies or modules we require; and timely installation of products. In addition, our financial results may be impacted by tariffs imposed by the United States on goods from other countries and tariffs imposed by other countries on U.S. goods. If any such tariffs are imposed on products or components that we import, including those obtained from a sole supplier or a limited group of suppliers, we could experience reduced revenues or may have to raise our prices, either of which could have an adverse effect on our business, financial condition and operating results.

These risks could be heightened during a substantial economic slowdown because our suppliers and subcontractors are more likely to experience adverse changes in their financial condition and operations during such a period. Further, these risks could materially and adversely affect our business if one of our sole sources, or a sole source of one of our suppliers or contract manufacturers, is adversely affected by a natural disaster or the outbreak of disease, epidemics and other pandemics, such as the COVID-19 pandemic, which has adversely impacted and may continue to adversely impact our supply chain. These risks could also be heightened by geopolitical factors. For example, a number of the components we use in our products are sourced through Taiwan. Deterioration of relations between Taiwan and China and the United States, the resulting actions taken by any of these parties, and other factors affecting the political or economic conditions of Taiwan in the future, could adversely impact our supply chain, international sales and operations. While we expend resources to qualify additional component sources, consolidation of suppliers and the small number of viable alternatives have limited the results of these efforts. Managing our supplier and contractor relationships is particularly difficult during time periods in which we introduce new products and during time periods in which demand for our products is increasing, especially if demand increases more quickly than we expect.

Plexus Services Corp. (“Plexus”), which manufactures our products at its facilities in Malaysia, currently serves as our primary contract manufacturer, and currently accounts for a majority, by dollar amount, of the products that we purchase from our contract manufacturers. Most of the products manufactured by our French and Israeli operations are outsourced to another third-party manufacturer in France and Israel, respectively. From time to time we assess our relationship with our contract manufacturers, and we do not generally maintain long-term agreements with any of our suppliers or contract manufacturers. Our agreement with Plexus has automatic annual renewals, unless prior notice is given by either party, and has been automatically renewed for a term expiring in October 2023.

Difficulties in managing relationships with any of our current contract manufacturers, particularly Plexus, that manufacture our products off-shore, or any of our suppliers of key components, subassemblies and modules used in our products, could impede our ability to meet our customers’ requirements and adversely affect our operating results. An inability to obtain adequate and timely deliveries of our products or any materials used in our products, or the inability of any of our contract manufacturers to scale their production to meet demand, such as the inability of certain of our contract manufacturers to operate at capacity for periods of time due to the COVID-19 pandemic, or any other circumstance that would require us to seek alternative sources of supply, had negatively impacted and could continue to negatively affect our ability to ship our products on a timely basis, which could damage relationships with current and prospective customers and harm our business and materially and adversely affect our revenue and other operating results. Furthermore, if we fail to meet customers’ supply expectations, our revenue would be adversely affected and we may lose sales opportunities, both short and long term, which could materially and adversely affect our business and our operating results, financial condition and cash flows. Increases, from time to time, in demand on our suppliers and subcontractors from our customers or from other parties have, on occasion, caused delays in the availability of certain components and products. In response, we may increase our inventories of certain components and products and expedite shipments of our products when necessary. These actions could increase our costs and could also increase our risk of holding obsolete or excess inventory, which, despite our use of a demand order fulfillment model, could materially and adversely affect our business, operating results, financial condition and cash flows.

Operational Risks

We rely on resellers, value-added resellers and systems integrators for a significant portion of our revenue, and disruptions to, or our failure to develop and manage our relationships with these customers or the processes and procedures that support them could adversely affect our business.

We generate a significant percentage of our revenue through sales to resellers, value-added resellers (“VARs”) and systems integrators that assist us with fulfillment or installation obligations. We expect that these sales will continue to generate a significant percentage of our revenue in the future. Accordingly, our future success is highly dependent upon establishing and maintaining successful relationships with a variety of channel partners.

We generally have no long-term contracts or minimum purchase commitments with any of our reseller, VAR or system integrator customers, and our contracts with these parties do not prohibit them from purchasing or offering products or services that compete with ours. Our competitors may provide incentives to any of our reseller, VAR or systems integrator customers to favor their products or, in effect, to prevent or reduce sales of our products. Any of our reseller, VAR or systems integrator customers may independently choose not to purchase or offer our products. Many of our resellers, and some of our VARs and system integrators are small, are based in a variety of international locations, and may have relatively unsophisticated processes and limited financial resources to conduct their business. Any significant disruption of our sales to these customers, including as a result of the inability or unwillingness of these customers to continue purchasing our products, or their failure to properly manage their business with respect to the purchase of, and payment for, our products, or their ability to comply with our policies and procedures as well as applicable laws, could materially and adversely affect our business, operating results, financial condition and cash flows. In addition, our failure to continue to establish or maintain successful relationships with reseller, VAR and systems integrator customers could likewise materially and adversely affect our business, operating results, financial condition and cash flows.

We face risks associated with having outsourced engineering resources located in Ukraine.

We outsource a portion of our research and development and product support activities to our third-party partner, GlobalLogic, a Hitachi group company. Through GlobalLogic, we have a significant number of engineering resources located in Kyiv, Ukraine that are dedicated to our Broadband and Video business segments. Political, social and economic instability and unrest or violence in Ukraine from the ongoing military conflict with the Russian Federation have caused, and may continue to cause, disruptions to the business and operations of GlobalLogic, which could slow or delay the development work our outsourced engineering teams are undertaking for us. Any escalation of political tensions, military activity, instability, unrest or conflict could limit or prevent our employees from traveling to, from, or within Ukraine to direct and coordinate our outsourced engineering teams, or cause us to shift all or portions of the development work occurring in Ukraine, and/or cause GlobalLogic to relocate personnel to other locations or countries pursuant to its business continuity plans. Any resulting delays could negatively impact our product development efforts, operating results and our business. In addition, increased costs associated with managing or relocating our outsourced engineering teams in Ukraine, or engaging with alternative engineering resources outside of Ukraine, could negatively impact our operating results and financial condition.

We may not be able to effectively manage our operations.

As of December 31, 2022, we had 964 employees in our international operations, representing approximately 72% of our worldwide workforce. In recent years, we have expanded our international operations significantly. Our ability to manage our business effectively in the future, including with respect to any future growth, our operation as both a hardware and increasingly software- and SaaS-centric business, the integration of any acquisition efforts such as our acquisition of TVN, and the breadth of our international operations, will require us to train, motivate and manage our employees successfully, to attract and integrate new employees into our overall operations, to retain key employees and to continue to improve and evolve our operational, financial and management systems. There can be no assurance that we will be successful in any of these efforts, and our failure to effectively manage our operations could have a material and adverse effect on our business, operating results, cash flows and financial condition.

We face risks associated with having facilities and employees located in Israel.

As of December 31, 2022, we maintained facilities in Israel with a total of 251 employees, or approximately 19% of our worldwide workforce. Our employees in Israel engage in a number of activities, for both our Video and Broadband business segments, including research and development, product development, product management, supply chain management for certain product lines and sales activities.

As such, we are directly affected by the political, economic and military conditions affecting Israel. Any significant conflict involving Israel could have a direct effect on our business or that of our Israeli contract manufacturers, in the form of physical damage or injury, restrictions from traveling or reluctance to travel to from or within Israel by our Israeli and other employees or those of our subcontractors, or the loss of Israeli employees to active military duty. Most of our employees in Israel are currently obligated to perform annual reserve duty in the Israel Defense Forces, and approximately 8% of those employees were called for active military duty in 2022. In the event that more of our employees are called to active duty, certain of our research and development activities may be significantly delayed and adversely affected. Further, the interruption or curtailment of trade between Israel and its trading partners, as a result of terrorist attacks or hostilities, conflicts between Israel and any other Middle Eastern country or organization, or any other cause, could significantly harm our business. Additionally, current or future tensions or conflicts in the Middle East could materially and adversely affect our business, operating results, financial condition and cash flows.

In order to manage our growth, we must be successful in addressing management succession issues and attracting and retaining qualified personnel.

Our future success will depend, to a significant extent, on the ability of our management to operate effectively, both individually and as a group. We must successfully manage transition and replacement issues that may result from the departure or retirement of members of our executive management. For example, our Chief Financial Officer recently announced his decision to resign effective as of March 3, 2023 and we have appointed an interim Chief Financial Officer while we conduct a search for a permanent successor. Any significant leadership change or senior management transition involves inherent risks and any failure to ensure timely and suitable replacements and smooth transition could hinder our strategic planning, business execution, and future performance. We cannot provide assurances that any current or future changes of management personnel in the future will not cause disruption to operations or customer relationships or a decline in our operating results.

We are also dependent on our ability to retain and motivate our existing highly qualified personnel, in addition to attracting new highly qualified personnel. Competition for qualified management, technical and other personnel is often intense, particularly in Silicon Valley, Israel and Hong Kong where we have significant research and development activities, and we may not be successful in attracting and retaining such personnel. Competitors and others have in the past attempted, and are likely in the future to attempt, to recruit our employees. While our employees are required to sign standard agreements concerning confidentiality, non-solicitation and ownership of inventions, other than in Israel, we generally do not have non-competition agreements with our personnel. The loss of the services of any of our key personnel, the inability to attract or retain highly qualified personnel in the future or delays in hiring such personnel, particularly senior management and engineers and other technical personnel, could negatively affect our business and operating results. We may need to increase our existing compensation levels in certain markets or for certain roles in response to competition, rising inflation or labor shortages, which may increase our operating costs. Furthermore, a certain portion of our personnel in the United States is comprised of foreign nationals whose ability to work for us depends on obtaining the necessary visas. Our ability to hire and retain foreign nationals in the United States, and their ability to remain and work in the United States, is affected by various laws and regulations, including limitations on the availability of visas. Changes in U.S. laws or regulations affecting the availability of visas have, and may continue to adversely affect, our ability to hire or retain key personnel and as a result may impair our operations.

Our products include third-party technology and intellectual property, and our inability to acquire new technologies or use third-party technology in the future could harm our business.

In order to successfully develop and market certain of our planned products, we may be required to enter into technology development or licensing agreements with third parties. Although companies with technology useful to us are often willing to enter into technology development or licensing agreements with respect to such technology, we cannot provide assurances that such agreements may be negotiated on commercially reasonable terms, or at all. The failure to enter, or a delay in entering, into such technology development or licensing agreements, when necessary or desirable, could limit our ability to develop and market new products and could materially and adversely affect our business.

We incorporate certain third-party technologies, including software programs, into our products, and, as noted, intend to utilize additional third-party technologies in the future. In addition, the technologies that we license may not operate properly or as specified, and we may not be able to secure alternatives in a timely manner, either of which could harm our business. We could face delays in product releases until alternative technology can be identified, licensed or developed, and integrated into our products, if we are able to do so at all. These delays, or a failure to secure or develop adequate technology, could materially and adversely affect our business, operating results, financial condition and cash flows.

Cybersecurity incidents, including data security breaches or computer viruses, could harm our business by disrupting our business operations, compromising our products and services, damaging our reputation or exposing us to liability.

Cyber criminals and hackers may attempt to penetrate our network security, misappropriate our proprietary information or cause business interruptions. Because the techniques used by such computer programmers to access or sabotage networks change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. In the past, we have faced compromises to our network security, and companies are facing additional attacks as workforces have become more distributed as a result of remote and hybrid working arrangements stemming from the COVID-19 pandemic. While we have invested in and continue to update our network security and cybersecurity infrastructure and systems, if our cybersecurity systems fail to protect against unauthorized access, sophisticated cyber-attacks, phishing schemes, ransomware, data protection breaches, computer viruses, denial-of-service attacks and similar disruptions from unauthorized tampering or human error, our ability to conduct our business effectively could be damaged in a number of ways, including:

- our intellectual property and other proprietary data, or financial assets, could be stolen;
- our ability to manage and conduct our business operations could be seriously disrupted;
- defects and security vulnerabilities could be introduced into our product, software and SaaS offerings, thereby damaging the reputation and perceived reliability and security of our products; and
- personally identifiable data of our customers, employees and business partners could be compromised.

Should any of the above events occur, our reputation, competitive position and business could be significantly harmed, and we could be subject to claims for liability from customers, third parties and governmental authorities. Additionally, we could incur significant costs in order to upgrade our cybersecurity systems and remediate damages. Consequently, our business, operating results, financial condition and cash flows could be materially and adversely affected. In addition, our business operations utilize and rely upon numerous third-party vendors, manufacturers, solution providers, partners and consultants, and any failure of such third parties' cybersecurity measures could materially and adversely affect or disrupt our business.

Our operating results could be adversely affected by natural disasters affecting us or impacting our third-party manufacturers, suppliers, resellers or customers.

Our corporate headquarters is located in California, which is prone to earthquakes. In addition, climate change is contributing to an increase in erratic weather patterns globally and intensifying the impact of certain types of catastrophes, such as floods, wildfires and droughts. We have employees, consultants and contractors located in regions and countries around the world. In the event that any of our business, sales or research and development centers or offices in the United States or internationally are adversely affected by an earthquake, flood, wildfire or by any other natural disaster, we may sustain damage to our operations and properties, which could cause a sustained interruption or loss of affected operations, and cause us to suffer significant financial losses.

We rely on third-party contract manufacturers for the production of our products. Any significant disruption in the business or operations of such manufacturers or of their or our suppliers could adversely impact our business. Our principal contract manufacturers and several of their and our suppliers and our resellers have operations in locations that are subject to natural disasters, such as severe weather, tsunamis, floods, fires and earthquakes, which could disrupt their operations and, in turn, our operations.

In addition, if there is a natural disaster in any of the locations in which our significant customers are located, we face the risk that our customers may incur losses or sustained business interruption, or both, which may materially impair their ability to continue their purchase of products from us. Accordingly, natural disaster in one of the geographies in which we, or our third-party manufacturers, their or our suppliers or our customers, operate could have a material and adverse effect on our business, operating results, cash flows and financial condition.

Financial, Transactional and Tax Risks

We may need additional capital in the future and may not be able to secure adequate funds at all or on terms acceptable to us.

We engage in the design, development and manufacture and sale of a variety of video and broadband products and system solutions, which has required, and will continue to require, significant research and development expenditures.

We are monitoring and managing our cash position in light of ongoing market conditions due to COVID-19, the Russia-Ukraine conflict and related macroeconomic conditions. We believe that our existing cash of approximately \$89.6 million at December 31, 2022 will satisfy our cash requirements for at least the next 12 months. However, we may need to raise additional funds to take advantage of presently unanticipated strategic opportunities, satisfy our other cash requirements from time to time, or strengthen our financial position. Our ability to raise funds may be adversely affected by a number of factors, including factors beyond our control, such as weakness in the economic conditions in markets in which we sell our products and continued uncertainty in financial, capital and credit markets. There can be no assurance that equity or debt financing will be available to us on reasonable terms, if at all, when and if it is needed.

We may raise additional financing through public or private equity or convertible debt offerings, debt financings, or corporate partnership or licensing arrangements. To the extent we raise additional capital by issuing equity securities or convertible debt, our stockholders may experience dilution, and any new equity or convertible debt securities we issue could have rights, preferences, and privileges superior to holders of our common stock. Further, volatility in equity capital markets may adversely affect market prices of our common stock. This may materially and adversely affect our ability to raise additional capital through public or private equity offerings. To the extent that we raise additional funds through collaboration and licensing arrangements, it may be necessary to relinquish some rights to our technologies or products, or grant licenses on terms that are not favorable to us. To the extent we raise capital through debt financing arrangements, we may be required to pledge assets or enter into covenants that could restrict our operations or our ability to incur further indebtedness and the interest on such debt may adversely affect our operating results. Further, rising interest rates may reduce our access to debt financing, which may adversely affect our future business plans and expected growth, and would increase the cost of long-term fixed rate and short-term variable rate borrowings, which could reduce our earnings.

If adequate capital is not available, or is not available on reasonable terms, when needed, we may not be able to take advantage of acquisition or other market opportunities, to timely develop new products, or to otherwise respond to competitive pressures.

Servicing our debt requires a significant amount of cash, and we may not have sufficient cash flow from our business to pay our substantial debt.

Our ability to make scheduled payments of the principal of, to pay interest on or to refinance our indebtedness, including our 2.00% Convertible Senior Notes due in 2024 (the “Notes”), or to make cash payments in connection with any conversion of the Notes or in connection with any repurchase of Notes upon the occurrence of a fundamental change before the maturity date at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus any accrued and unpaid interest thereon, as set forth in the indenture governing the Notes, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not continue to generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness, including the Notes will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations, including the Notes.

In addition, our ability to repurchase the Notes or to pay cash upon conversions of the Notes or at their maturity may be limited by law, regulatory authority, or agreements governing our future indebtedness. Our failure to repurchase the Notes at a time when the repurchase is required by the indenture governing the Notes or to pay cash upon conversions of the Notes or at their maturity as required by the indenture governing the Notes would constitute a default under the indenture. A default under the indenture, or the fundamental change itself, could also lead to a default under agreements governing our future indebtedness. Moreover, the occurrence of a fundamental change under the indenture governing the Notes could constitute an event of default under any such agreement. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the Notes or make cash payments upon conversions thereof.

Despite our current debt levels, we may still incur substantially more debt or take other actions which would intensify the risks discussed above.

Despite our current consolidated debt levels, we and our subsidiaries may be able to incur substantial additional debt in the future, subject to the restrictions contained in our debt instruments, some of which may be secured debt. We are not restricted under the terms of the indenture governing the Notes from incurring additional debt, securing existing or future debt, recapitalizing our debt or taking a number of other actions that are not limited by the terms of the indenture governing the Notes that could have the effect of diminishing our ability to make payments on our debt (including the Notes) when due. In addition, the Credit Agreement we entered into with JPMorgan Chase Bank, N.A., as lender, and Harmonic International GmbH, as co-borrower, on December 19, 2019 and most recently amended in October 2022, permits us to incur certain additional indebtedness and grant certain liens on our assets that could intensify the risks discussed above.

The conditional conversion feature of the Notes, if triggered, may adversely affect our financial condition and operating results.

In the event the conditional conversion feature of the Notes is triggered, holders of Notes will be entitled under the indenture governing the Notes to convert the Notes at any time during specified periods at their option. During the fourth quarter of fiscal 2021, the Company made an irrevocable election under the terms of the indenture governing the Notes to settle the principal portion of the Notes solely with cash and may pay or deliver, as the case may be, any conversion value greater than the principal amount in cash, shares of common stock or a combination thereof, at the Company's election. Accordingly, if one or more holders elect to convert their Notes, we would be required to settle the principal portion of our conversion obligation through the payment of cash, which could adversely affect our liquidity. In addition, even if holders do not elect to convert their Notes, we could be required under applicable accounting rules to reclassify all or a portion of the outstanding principal of the Notes as a current rather than long-term liability, which would result in a material reduction of our net working capital.

We have made, and may continue to make, acquisitions, and any acquisition could disrupt our operations, cause dilution to our stockholders and materially and adversely affect our business, operating results, cash flows and financial condition.

As part of our business strategy, from time to time we have acquired, and we may continue to acquire, businesses, technologies, assets and product lines that we believe complement or expand our existing business. Acquisitions involve numerous risks, including the following:

- unanticipated costs or delays associated with an acquisition;
- difficulties in the assimilation and integration of acquired operations, technologies and/or products;
- potential disruption of our business and the diversion of management's attention from the regular operations of the business during the acquisition process;
- the challenges of managing a larger and more geographically widespread operation and product portfolio after the closing of the acquisition;
- potential adverse effects on new and existing business relationships with suppliers, contract manufacturers, resellers, partners and customers;
- compliance with regulatory requirements, such as local employment regulations and organized labor in France;
- risks associated with entering markets in which we may have no or limited prior experience;
- the potential loss of key employees of acquired businesses and our own business as a result of integration;
- difficulties in bringing acquired products and businesses into compliance with applicable legal requirements in jurisdictions in which we operate and sell products;
- impact of known potential liabilities or unknown liabilities, including litigation and infringement claims, associated with companies we acquire;
- substantial charges for acquisition costs or for the amortization of certain purchased intangible assets, deferred stock compensation or similar items;
- substantial impairments to goodwill or intangible assets in the event that an acquisition proves to be less valuable than the price we paid for it;
- difficulties in establishing and maintaining uniform financial and other standards, controls, procedures and policies;

- delays in realizing, or failure to realize, the anticipated benefits of an acquisition; and
- the possibility that any acquisition may be viewed negatively by our customers or investors or the financial markets.

Competition within our industry for acquisitions of businesses, technologies, assets and product lines has been, and is likely to continue to be, intense. As such, even if we are able to identify an acquisition that we would like to consummate, we may not be able to complete the acquisition on commercially reasonable terms or because the target chooses to be acquired by another company. Furthermore, in the event that we are able to identify and consummate any future acquisitions, we may, in each of those acquisitions:

- issue equity securities which would dilute current stockholders' percentage ownership;
- incur substantial debt to finance the acquisition or assume substantial debt in the acquisition;
- incur significant acquisition-related expenses;
- assume substantial liabilities, contingent or otherwise; or
- expend significant cash.

These financing activities or expenditures could materially and adversely affect our operating results, cash flows and financial condition or the price of our common stock. Alternatively, due to difficulties in the capital or credit markets at the time, we may be unable to secure capital necessary to complete an acquisition on reasonable terms, or at all. Moreover, even if we were to obtain benefits from acquisitions in the form of increased revenue and earnings per share, there may be a delay between the time the expenses associated with an acquisition are incurred and the time we recognize such benefits.

In addition to the risks outlined above, if we are unable to successfully receive payment of any significant portion of our existing French R&D credit receivables from the French authority as expected, or are unable to successfully apply for or otherwise obtain the financial benefit of new French R&D credits in future years, our ability to achieve the anticipated benefits of the acquisition as well as our business, operating results and financial condition could be adversely affected.

As of December 31, 2022, we had approximately \$237.7 million of goodwill recorded on our balance sheet associated with prior acquisitions. In the event we determine that our goodwill is impaired, we would be required to write down all or a portion of such goodwill, which could result in a material non-cash charge to our results of operations in the period in which such write-down occurs.

If we are unable to successfully address one or more of these risks, our business, operating results, financial condition and cash flows could be materially and adversely affected.

We may sell one or more of our product lines, from time to time, as a result of our evaluation of our products and markets, and any such divestiture could adversely affect our continuing business and our expenses, revenues, results of operation, cash flows and financial position.

We periodically evaluate our various product lines and may, as a result, consider the divestiture of one or more of those product lines. We have sold product lines in the past, and any prior or future divestiture could adversely affect our continuing business and expenses, revenues, results of operations, cash flows and financial position.

Divestitures of product lines have inherent risks, including the expense of selling the product line, the possibility that any anticipated sale will not occur, delays in closing any sale, the risk of lower-than-expected proceeds from the sale of the divested business, unexpected costs associated with the separation of the business to be sold from the seller's information technology and other operating systems, and potential post-closing claims for indemnification or breach of transition services obligations of the seller. Expected cost savings, which are offset by revenue losses from divested businesses, may also be difficult to achieve or maximize due to the seller's fixed cost structure, and a seller may experience varying success in reducing fixed costs or transferring liabilities previously associated with the divested business.

The nature of our business requires the application of complex revenue and expense recognition rules and the current legislative and regulatory environment affecting generally accepted accounting principles is uncertain. Significant changes in current principles could affect our financial statements going forward and changes in financial accounting standards or practices may cause adverse, unexpected financial reporting fluctuations and harm our operating results.

United States generally accepted accounting principles (“U.S. GAAP”) are subject to interpretation by the Financial Standards Accounting Board (“FASB”), the SEC and various bodies formed to promulgate and interpret appropriate accounting principles. We are also subject to evolving rules and regulations of the countries in which we do business. Changes to accounting standards or interpretations thereof may result in different accounting principles under U.S. GAAP that have a significant effect on our reported financial results and require us to incur costs and expenses in order to comply with the updated standards or interpretations.

In addition, we have in the past and may in the future need to modify our customer contracts, accounting systems and processes when we adopt future or proposed changes in accounting principles. The cost and effect of these changes may negatively impact our results of operations during the periods of transition.

Fluctuations in our future effective tax rates could affect our future operating results, financial condition and cash flows.

We are required to periodically review our deferred tax assets and determine whether, based on available evidence, a valuation allowance is necessary. The realization of our deferred tax assets, which are predominantly in the United States, is dependent upon the generation of sufficient U.S. and foreign taxable income in the future to offset these assets. Based on our evaluation, we recorded a net increase in valuation allowance of \$10.8 million and \$0.3 million in 2022 and 2021, respectively, against the net deferred tax assets. There was no valuation allowance release in 2022. The increases in valuation allowance in 2021 was offset by the valuation allowance release of \$9.6 million related to deferred taxes for certain foreign jurisdictions. The Company reduced its valuation allowance in 2021 based on continued improved operating results over the past few years and expectations about generating foreign taxable income in the future. Changes in the amount of the valuation allowance in the U.S. and in foreign jurisdictions could result in a material non-cash expense or benefit in the period in which the valuation allowance is adjusted and our results of operations could be materially affected.

The calculation of tax liabilities involves dealing with uncertainties in the application of complex global tax regulations. We recognize potential liabilities for anticipated tax audit issues in the U.S. and other tax jurisdictions based on our estimate of whether, and the extent to which, additional taxes will be due. In the event we determine that it is appropriate to create a reserve or increase an existing reserve for any such potential liabilities, the amount of the additional reserve will be charged as an expense in the period in which it is determined. If payment of these amounts ultimately proves to be unnecessary, the reversal of the liabilities would result in tax benefits being recognized in the period when we determine the liabilities are no longer necessary. If the estimate of tax liabilities proves to be less than the ultimate tax assessment for the applicable period, a further charge to expense in the period such shortfall is determined would result. Either such charge to expense could have a material and adverse effect on our operating results for the applicable period.

Our future effective income tax rates could be adversely affected if tax authorities challenge our international tax structure or if our relative mix of U.S. and international income changes for any reason. Accordingly, there can be no assurance that our effective income tax rate will be less than the U.S. federal statutory rate in future periods.

We are subject to taxation-related risks in multiple jurisdictions, and the adoption and interpretation of new tax legislation, tax regulations, tax rulings, or exposure to additional tax liabilities could materially affect our business, financial condition and results of operations.

Tax laws are regularly re-examined and evaluated globally. New laws and interpretations of the law are taken into account for financial statement purposes in the quarter or year that they become applicable. Tax authorities are increasingly scrutinizing the tax positions of multinational companies. If U.S. or other foreign tax authorities change applicable tax laws, or if there is a change in interpretation of existing law, our overall liability could increase, and our business, financial condition and results of operations may be harmed.

In December 2017, the legislation commonly referred to as the Tax Cuts and Jobs Act (the Tax Act) was enacted, which contains significant changes to U.S. tax law, including a reduction in the U.S. corporate tax rate and a transition to a new partial territorial system of taxation. The primary impact of the Tax Act on our provision for (benefit from) income taxes was a reduction of the future tax benefits of our deferred tax assets as a result of the reduction in the corporate income tax rate.

In addition, as of January 1, 2022, the Tax Act requires research and experimental expenditures attributable to research conducted within the United States to be capitalized and amortized ratably over a five-year period. Any such expenditures attributable to research conducted outside the United States must be capitalized and amortized over a 15-year period. The Internal Revenue Service has not issued Treasury Regulations which provide guidance on how to apply this new tax law. If or when Treasury Regulations are released, it may impact the Company's estimate of capitalized costs or the Company's current interpretation of the tax law. There continues to be legislative discussions about removing this capitalization requirement in 2023. It is currently unlikely there will be any retroactive application to the 2022 capitalization requirement. Any change in tax law will be accounted for in the period of enactment.

Certain provisions of the Tax Act were modified by legislation enacted in March 2020, entitled the Coronavirus Aid, Relief, and Economic Security Act (the CARES Act), and the impact of both the Tax Act and the CARES Act is subject to ongoing technical guidance and accounting interpretation, which we will continue to monitor and assess. Further, the Inflation Reduction Act of 2022 (the "IRA"), has become effective as of January 1, 2023, which, among other things, imposes a one-percent non-deductible excise tax on certain repurchases of stock that are made by U.S. publicly traded corporations on or after January 1, 2023, which may affect our share repurchase program.

In addition, the Organization for Economic Co-operation and Development, the European Union, as well as a number of other countries and organizations have recently enacted new laws, and proposed or recommended changes to existing tax laws, that may increase our tax obligations in many countries where we do business or require us to change the manner in which we operate our business. As we expand the scale of our business activities, any changes in U.S. or foreign tax laws that apply to such activities may increase our worldwide effective tax rate and harm our business, financial condition and results of operations.

Legal, Regulatory and Compliance Risks

We or our customers may face intellectual property infringement claims from third parties.

Our industry is characterized by the existence of a large number of patents and frequent claims and related litigation regarding patent and other intellectual property rights. In particular, leading companies in the telecommunications industry have extensive patent portfolios. Also, patent infringement claims and litigation by entities that purchase or control patents, but do not produce goods or services covered by the claims of such patents (so-called "non-practicing entities" or "NPEs"), have increased rapidly over the last decade or so. From time to time, third parties, including NPEs, have asserted, and may assert in the future, patent, copyright, trademark and other intellectual property rights against us or our customers, and have initiated audits to determine whether we have missed royalty payments for technology that we license. Our suppliers and their customers, including us, may have similar claims asserted against them. A number of third parties, including companies with greater financial and other resources than us, have asserted patent rights to technologies that are important to us.

Any intellectual property litigation, regardless of its outcome, could result in substantial expense and significant diversion of the efforts of our management and technical personnel. An adverse determination in any such proceeding could subject us to significant liabilities and temporary or permanent injunctions and require us to seek licenses from third parties or pay royalties that may be substantial. Furthermore, necessary licenses may not be available on terms satisfactory to us, or at all. An unfavorable outcome on any such litigation matter could require that we pay substantial damages, could require that we pay ongoing royalty payments, or could prohibit us from selling certain of our products. Any such outcome could have a material and adverse effect on our business, operating results, financial condition and cash flows.

Our suppliers and customers may have intellectual property claims relating to our products asserted against them. We have agreed to indemnify some of our suppliers and most of our customers for patent infringement relating to our products. The scope of this indemnity varies, but, in some instances, includes indemnification for damages and expenses (including reasonable attorney's fees) incurred by the supplier or customer in connection with such claims. If a supplier or a customer seeks to enforce a claim for indemnification against us, we could incur significant costs defending such claim, the underlying claim or both. An adverse determination in either such proceeding could subject us to significant liabilities and have a material and adverse effect on our operating results, cash flows and financial condition.

We may be the subject of litigation which, if adversely determined, could harm our business and operating results.

We may be subject to claims arising in the normal course of business. The costs of defending any litigation, whether in cash expenses or in management time, could harm our business and materially and adversely affect our operating results and cash flows. An unfavorable outcome on any litigation matter could require that we pay substantial damages, or, in connection with any intellectual property infringement claims, could require that we pay ongoing royalty payments or prohibit us from selling certain of our products. In addition, we may decide to settle any litigation, which could cause us to incur significant settlement costs. A settlement or an unfavorable outcome on any litigation matter could have a material and adverse effect on our business, operating results, financial condition and cash flows.

Our failure to adequately protect our proprietary rights and data may adversely affect us.

At December 31, 2022, we held 121 issued U.S. patents and 49 issued foreign patents, and had 56 patent applications pending. Although we attempt to protect our intellectual property rights through patents, trademarks, copyrights, licensing arrangements, maintaining certain technology as trade secrets and other measures, we can give no assurances that any patent, trademark, copyright or other intellectual property rights owned by us will not be invalidated, circumvented or challenged, that such intellectual property rights will provide competitive advantages to us, or that any of our pending or future patent applications will be issued with the scope of the claims sought by us, if at all. We can give no assurances that others will not develop technologies that are similar or superior to our technologies, duplicate our technologies or design around the patents that we own. In addition, effective patent, copyright and trade secret protection may be unavailable or limited in certain foreign countries in which we do business or may do business in the future.

We may enter into confidentiality or license agreements with our employees, consultants, and vendors and our customers, as needed, and generally limit access to, and distribution of, our proprietary information. Nevertheless, we cannot provide assurances that the steps taken by us will prevent misappropriation of our technology. In addition, we have taken in the past, and may take in the future, legal action to enforce our patents and other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others, or to defend against claims of infringement or invalidity. Such litigation could result in substantial costs and diversion of management time and other resources, and could materially and adversely affect our business, operating results, financial condition and cash flows.

Our use of open source software in some of our products may expose us to certain risks.

Some of our products contain software modules licensed for use from third-party authors 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 we use. If we combine our proprietary software with open source software in a certain manner, we could, under certain of the open source licenses, be required to release the source code of our proprietary software to the public. This could allow our competitors to create similar products with lower development effort and in less time and ultimately could result in a loss of product sales for us.

Although we monitor our use of open source closely, it is possible our past, present or future use of open source has triggered or may trigger the foregoing requirements. Furthermore, the terms of many open source licenses have not been interpreted by U.S. courts, and there is a risk that such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products. In such event, we could be required to seek licenses from third parties in order to continue offering our products, to re-engineer our products or to discontinue the sale of our products in the event re-engineering cannot be accomplished on a timely basis, any of which could materially and adversely affect our operating results, financial condition and cash flows.

We are subject to import and export control and trade and economic sanction laws and regulations that could subject us to liability or impair our ability to compete in international markets.

Our products are subject to U.S. export control laws, and may be exported outside the United States only with the required export license or through an export license exception, in most cases because we incorporate encryption technology into certain of our products. We are also subject to U.S. trade and economic sanction regulations which include prohibitions on the sale or supply of certain products and services to the United States embargoed or sanctioned countries, governments, persons and entities. In addition, various countries regulate the import of certain technology 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. Although we take precautions and have processes in place to prevent our products and services from being provided in violation of such laws, our products may have been in the past, and could in the future be, provided inadvertently in violation of such laws, despite the precautions we take. In March 2020, we received an administrative subpoena from the U.S. Treasury Department's office of Foreign Assets Control ("OFAC") requesting information about transactions involving Iran. The transactions were by the French company TVN, which we acquired in early 2016. Pursuant to regulations that remained in place until 2018, foreign subsidiaries of U.S. companies were allowed to engage in transactions with Iran if certain requirements were met. In February 2023, OFAC notified us that it had completed its review of these matters and closed its review with the issuance of a Cautionary Letter. While OFAC did not assess any penalties, the Cautionary Letter does not preclude OFAC from taking future enforcement actions if additional information warrants renewed attention. Furthermore, OFAC may consider our regulatory history, including this subpoena, our disclosures and Cautionary Letter, if we are involved in future enforcement cases for failure to comply with export control laws and regulations. If we are found to have violated U.S. export control laws as a result of future investigations, we and certain of our employees could be subject to civil or criminal penalties, including the possible loss of export privileges, monetary penalties, and, in extreme cases, imprisonment of responsible employees for knowing and willful violations of these laws which could lead to penalties, reputational harm, loss of access to certain markets, or otherwise.

In addition, we may be subject to customs duties that could have a significant adverse impact on our operating results or, if we are able to pass on the related costs in any particular situation, would increase the cost of the related product to our customers. As a result, the future imposition of significant increases in the level of customs duties or the creation of import quotas on our products in Europe or in other jurisdictions, or any of the limitations on international sales described above, could have a material adverse effect on our business, operating results, financial condition and cash flows. Further, some of our customers in Europe have been, or are being, audited by local governmental authorities regarding the tariff classifications used for importation of our products. Import duties and tariffs vary by country and a different tariff classification for any of our products may result in higher duties or tariffs, which could have an adverse impact on our operating results and potentially increase the cost of the related products to our customers.

Our business and industry are subject to various laws and regulations that could adversely affect our business, operating results, cash flows and financial condition.

Our business and industry are regulated under various federal, state, local and international laws. For example, we are subject to environmental regulations such as the European Union's Waste Electrical and Electronic Equipment ("WEEE") and Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment ("RoHS") directives and similar legislation enacted in other jurisdictions worldwide. Our failure to comply with these laws could result in our being directly or indirectly liable for costs, fines or penalties and third-party claims, and could jeopardize our ability to conduct business in such regions and countries. We expect that our operations will be affected by other new environmental laws and regulations on an ongoing basis. Although we cannot predict the ultimate impact of any such new laws and regulations, they would likely result in additional costs, and could require that we redesign or change how we manufacture our products, any of which could have a material and adverse effect on our operating results, financial condition and cash flows.

We are subject to the Sarbanes-Oxley Act of 2002 which, among other things, requires an annual review and evaluation of our internal control over financial reporting. If we conclude in future periods that our internal control over financial reporting is not effective or if our independent registered public accounting firm is unable to provide an unqualified attestation as of future year-ends, we may incur substantial additional costs in an effort to correct such problems, and investors may lose confidence in our financial statements, and our stock price may decrease in the short term, until we correct such problems, and perhaps in the long term, as well.

We are subject to requirements under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 that require us to conduct research, disclose, and report whether or not our products contain certain conflict minerals sourced from the Democratic Republic of Congo or its surrounding countries. The implementation of these requirements could adversely affect the sourcing, availability, and pricing of the materials used in the manufacture of components used in our products. In addition, we may incur certain additional costs to comply with the disclosure requirements, including costs related to conducting diligence procedures to determine the sources of conflict minerals that may be used or necessary to the production of our products and, if applicable, potential changes to products, processes or sources of supply as a consequence of such verification activities. It is also possible that we may face reputational harm if we determine that certain of our products contain minerals not determined to be conflict-free and/or we are unable to alter our products, processes or sources of supply to avoid such materials.

Changes in telecommunications legislation and regulations in the United States and other countries could affect our sales and the revenue we are able to derive from our products. In particular, on December 14, 2017, the U.S. Federal Communications Commission (“FCC”) voted to repeal the “net neutrality” rules and return to a “light-touch” regulatory framework. The FCC’s new rules, which took effect in June 2018, granted providers of broadband internet access services greater freedom to make changes to their services, including, potentially, changes that may discriminate against or otherwise harm our business. However, a number of parties have appealed these rules, which appeals are currently being reviewed by the D.C. Circuit Court of Appeals; thus the future impact of the FCC’s repeal and any changes thereto remains uncertain. Additionally, on September 30, 2018, California enacted the California Internet Consumer Protection and Net Neutrality Act of 2018. Since the FCC repealed its nationwide regulations, seven states have also enacted a state-level net neutrality law and a number of other states are considering legislation or executive actions that would regulate the conduct of broadband providers. We cannot predict whether the FCC order or state initiatives will be modified, overturned, or vacated by legal action of the court, federal legislation, or the FCC. The repeal of the net neutrality rules or other regulations dealing with access by competitors to the networks of incumbent operators could slow or stop infrastructure and services investments or expansion by service providers. Increased regulation of our customers’ pricing or service offerings could limit their investments and, consequently, revenue from our products. The impact of new or revised legislation or regulations could have a material adverse effect on our business, operating results, financial condition and cash flows.

We depend significantly on our international revenue and are subject to the risks associated with international operations, including those of our resellers, contract manufacturers and outsourcing partners, which may negatively affect our operating results.

Revenue derived from customers outside of the United States in the fiscal years ended December 31, 2022, 2021 and 2020 represented approximately 37%, 44% and 49% of our revenue, respectively. Although no assurance can be given with respect to international sales growth in any one or more regions, we expect that international revenue will likely continue to represent, from year to year, a majority, and potentially increasing, percentage of our annual revenue for the foreseeable future. A significant percentage of our revenue is generated from sales to resellers, VARs and systems integrators, particularly in emerging market countries. Furthermore, the majority of our employees are based in our international offices and locations, and most of our contract manufacturing occurs outside of the United States. In addition, we outsource a portion of our research and development activities to certain third-party partners with development centers located in different countries, particularly Ukraine and India.

Our international operations, international operations of our resellers, contract manufacturers and outsourcing partners, and our efforts to maintain and increase revenue in international markets are subject to a number of risks, which are generally greater with respect to emerging market countries, including the following:

- growth and stability of the economy in one or more international regions, including regional economic impacts of the COVID-19 pandemic, the Russia-Ukraine conflict and rising tensions between China and Taiwan and the United States;
- fluctuations in currency exchange rates;
- changes in foreign government regulations and telecommunications standards;
- import and export license requirements, tariffs, taxes, economic sanctions, contractual limitations and other trade barriers;
- our significant reliance on resellers and others to purchase and resell our products and solutions, particularly in emerging market countries;
- availability of credit, particularly in emerging market countries;
- longer collection periods and greater difficulty in enforcing contracts and collecting accounts receivable, especially from smaller customers and resellers, particularly in emerging market countries;

- compliance with the FCPA, the U.K. Bribery Act and/or similar anti-corruption and anti-bribery laws, particularly in emerging market countries;
- the burden of complying with a wide variety of foreign laws, treaties and technical standards;
- fulfilling “country of origin” requirements for our products for certain customers;
- difficulty in staffing and managing foreign operations;
- business and operational disruptions or delays caused by political, social and/or economic instability and unrest (e.g., Ukraine), including risks related to terrorist activity, particularly in emerging market countries;
- changes in economic policies by foreign governments, including the imposition and potential continued expansion of economic sanctions by the United States and the European Union on the Russian Federation;
- changes in diplomatic and trade relationships, including the imposition of new trade restrictions, trade protection measures, import or export requirements, trade embargoes and other trade barriers, including those between the United States and China;
- any negative economic impacts resulting from the political environment in the United States or the United Kingdoms’ exit from the European Union; and
- business and economic disruptions and delays caused by outbreaks of disease, epidemics and potential pandemics, such as the COVID-19 pandemic, which has led and may continue to lead to trade shows and in-person meetings being canceled or delayed and employees working remotely, and which has impacted our supply chain and may continue to impact our supply chain or general business in other manners.

We have certain international customers who are billed in their local currency, primarily the Euro, British pound and Japanese yen, which subjects us to foreign currency risk. In addition, a portion of our operating expenses relating to the cost of certain international employees, are denominated in foreign currencies, primarily the Euro, Israeli shekel, British pound, Singapore dollar, Chinese yuan and Indian rupee. Although we do hedge against the Euro, British pound, Israeli shekel and Japanese yen, gains and losses on the conversion to U.S. dollars of accounts receivable, accounts payable and other monetary assets and liabilities arising from international operations may contribute to fluctuations in our operating results. Furthermore, payment cycles for international customers are typically longer than those for customers in the United States. Unpredictable payment cycles could cause us to fail to meet or exceed the expectations of security analysts and investors for any given period.

Most of our international revenue is denominated in U.S. dollars, and fluctuations in currency exchange rates could cause our products to become relatively more expensive to customers in a particular country or region, leading to a reduction in revenue or profitability from sales in that country or region. The potential negative impact of a strong U.S. dollar on our business may be exacerbated by the significant devaluation of a number of foreign currencies. Also, if the U.S. dollar were to weaken against many foreign currencies, there can be no assurance that a weaker dollar would lead to growth in customer spending in foreign markets.

Our operations outside the United States also require us to comply with a number of U.S. and international regulations that prohibit improper payments or offers of payments to foreign governments and their officials and political parties for corrupt purposes. For example, our operations in countries outside the United States are subject to the FCPA and similar laws, including the U.K. Bribery Act. Our activities in certain emerging countries create the risk of unauthorized payments or offers of payments by one of our employees, consultants, sales agents or channel partners that could be in violation of various anti-corruption laws, even though these parties may not be under our control. Under the FCPA and U.K. Bribery Act, companies may be held liable for the corrupt actions taken by their directors, officers, employees, channel partners, sales agents, consultants, or other strategic or local partners or representatives. We have internal control policies and procedures with respect to FCPA compliance, have implemented FCPA training and compliance programs for our employees, and include in our agreements with resellers a requirement that those parties comply with the FCPA. However, we cannot provide assurances that our policies, procedures and programs will prevent violations of the FCPA or similar laws by our employees or agents, particularly in emerging market countries, and as we expand our international operations. Any such violation, even if prohibited by our policies, could result in criminal or civil sanctions against us.

The effect of one or more of these international risks could have a material and adverse effect on our business, financial condition, operating results and cash flows.

Risks Related to Ownership of Our Common Stock

Some anti-takeover provisions contained in our certificate of incorporation and bylaws, as well as provisions of Delaware law, could impair a takeover attempt.

We have provisions in our certificate of incorporation and bylaws that could have the effect of rendering more difficult or discouraging an acquisition deemed undesirable by our Board. These include provisions:

- authorizing blank check preferred stock, which could be issued with voting, liquidation, dividend and other rights superior to our common stock;
- limiting the liability of, and providing indemnification to, our directors and officers;
- limiting the ability of our stockholders to call, and bring business before, special meetings;
- 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;
- controlling the procedures for conducting and scheduling of Board and stockholder meetings; and
- providing our Board with the express power to postpone previously scheduled annual meetings and to cancel previously scheduled special meetings.

These provisions could delay hostile takeovers, changes in control of the Company or changes in our management. As a Delaware corporation, we are also subject to provisions of Delaware law, including Section 203 of the Delaware General Corporation law, which prevents some stockholders holding more than 15% of our outstanding common stock from engaging in certain business combinations without approval of the holders of substantially all of our outstanding common stock. Any provision of our certificate of incorporation or bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Our common stock price may be extremely volatile, and the value of an investment in our stock may decline.

Our common stock price has been highly volatile. We expect that this volatility will continue in the future due to factors such as:

- general market and economic conditions, including inflation, rising interest rates, volatile capital markets and ongoing supply chain disruptions and the related impacts of the COVID-19 pandemic, the Russia-Ukraine conflict and rising tensions between China and Taiwan and the United States;
- actual or anticipated variations in operating results;
- increases or decreases in the general stock market or to the stock prices of technology companies;
- announcements of technological innovations, new products or new services by us or by our competitors or customers;
- changes in financial estimates or recommendations by stock market analysts regarding us or our competitors;
- announcements by us or our competitors of significant acquisitions, dispositions, strategic partnerships, joint ventures or capital commitments;
- announcements by our customers regarding end user market conditions and the status of existing and future infrastructure network deployments;
- additions or departures of key personnel; and
- future equity or debt offerings or our announcements of these offerings.

In addition, in recent years, the stock market in general, and The NASDAQ Global Select Market and the securities of technology companies in particular, have experienced extreme price and volume fluctuations. These fluctuations have often been unrelated or disproportionate to the operating performance of individual companies. These broad market fluctuations have in the past, and may in the future, materially and adversely affect our stock price, regardless of our operating results. In these circumstances, investors may be unable to sell their shares of our common stock at or above their purchase price over the short term, or at all.

We cannot guarantee that our stock repurchase program will be fully implemented or that it will enhance long-term stockholder value.

In February 2022, our Board of Directors approved a stock repurchase program for the repurchase of up to \$100 million of the outstanding shares of our common stock. The repurchase program expires in February 2025 and we are not obligated to repurchase a specified number or dollar value of shares. Share repurchases will be made from time to time in open market purchases and 10b5-1 trading plans, as permitted by securities laws and other legal requirements. Any share repurchases remain subject to the circumstances in place at that time, including prevailing market prices. As a result, there can be no guarantee around the timing or volume of our share repurchases. The stock repurchase program could affect the price of our common stock, increase volatility and diminish our cash reserves. Our repurchase program may be suspended or terminated at any time and, even if fully implemented, may not enhance long-term stockholder value.

Our stock price may decline if additional shares are sold in the market or if analysts drop coverage of or downgrade our stock.

Future sales of substantial amounts of shares of our common stock by our existing stockholders in the public market, or the perception that these sales could occur, may cause the market price of our common stock to decline. In addition, we issue additional shares upon exercise of stock options, including under our 2002 Employee Stock Purchase Plan, and in connection with grants of restricted stock units on an ongoing basis. To the extent we do not elect to pay solely cash upon conversion of the Notes, we will also be required to issue additional shares of common stock upon conversion. Increased sales of our common stock in the market after exercise of outstanding stock options or grants of restricted stock units could exert downward pressure on our stock price. These sales also might make it more difficult for us to sell equity or equity-related securities in the future at a time and price we deem appropriate.

The trading market for our common stock relies in part on the availability of research and reports that third-party industry or securities analysts publish about us and our business. If we do not maintain adequate research coverage or if one or more of the analysts who do cover us downgrade our stock or publishes inaccurate or unfavorable research about our business, our stock price may decline. If one or more of these analysts cease coverage of us or fails to publish reports on us regularly, we could lose visibility in the market, which in turn could cause the liquidity of our stock and our stock price to decline.

Item 1B. *UNRESOLVED STAFF COMMENTS*

None.

Item 2. *PROPERTIES*

All of our facilities are leased, including our principal operations and corporate headquarters in San Jose, California. We have research and development centers in the United States, France, Israel and Hong Kong. We have sales and service offices primarily in the United States and various locations in Europe and Asia. Our leases, which expire at various dates through September 2032, are for an aggregate of approximately 303,087 square feet of space. We have two business segments: Video and Broadband. Because of the interrelation of these segments, a majority of these segments use substantially all of the properties, at least in part, and we retain the flexibility to use each of the properties in whole or in part for each of the segments. We believe that the facilities that we currently occupy are adequate for our current needs and that suitable additional space will be available, as needed, to accommodate the presently foreseeable expansion of our operations.

Item 3. *LEGAL PROCEEDINGS*

From time to time, we are involved in lawsuits as well as subject to various legal proceedings, claims, threats of litigation, and investigations in the ordinary course of business, including claims of alleged infringement of third-party patents and other intellectual property rights, commercial, employment, and other matters. While certain matters to which we are a party may specify the damages claimed, such claims may not represent reasonably possible losses. Given the inherent uncertainties of litigation, the ultimate outcome of these matters cannot be predicted at this time, nor can the amount of possible loss or range of loss, if any, be reasonably estimated.

An unfavorable outcome on any litigation matters could require us to pay substantial damages, or, in connection with any intellectual property infringement claims, could require us to pay ongoing royalty payments or could prevent us from selling certain of our products. As a result, a settlement of, or an unfavorable outcome on, any of the matters referenced above or other litigation matters could have a material adverse effect on our business, operating results, financial position and cash flows.

Our industry is characterized by the existence of a large number of patents and frequent claims and related litigation regarding patent and other intellectual property rights. From time to time, third parties have asserted, and may in the future assert, exclusive patent, copyright, trademark and other intellectual property rights against us or our customers. Such assertions arise in the normal course of our operations. The resolution of any such assertions and claims cannot be predicted with certainty.

Item 4. *MINE SAFETY DISCLOSURE*

Not applicable.

PART II

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

Market Information of our Common Stock

Our common stock is traded on The NASDAQ Global Select Market under the symbol HLIT, and has been listed on NASDAQ since our initial public offering in 1995.

Holders

As of February 22, 2023, there were approximately 287 holders of record of our common stock.

Dividend Policy

We have never declared or paid any dividends on our capital stock. At this time, we expect to retain future earnings, if any, for use in the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future.

Unregistered Sales of Equity Securities

There were no unregistered sales of equity securities during the year ended December 31, 2022.

Issuer Purchases of Equity Securities

On February 3, 2022, the Board of Directors authorized the Company to repurchase up to \$100 million of the Company's outstanding shares of common stock through February 2025. The Company is authorized to repurchase, from time-to-time, shares of its outstanding common stock through open market purchases and 10b5-1 trading plans, in accordance with applicable rules and regulations, at such time and such prices as management may decide. The program does not obligate the Company to repurchase any specific number of shares and may be discontinued at any time. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors. As of December 31, 2022, approximately \$94.9 million of the share repurchase authorization remained available.

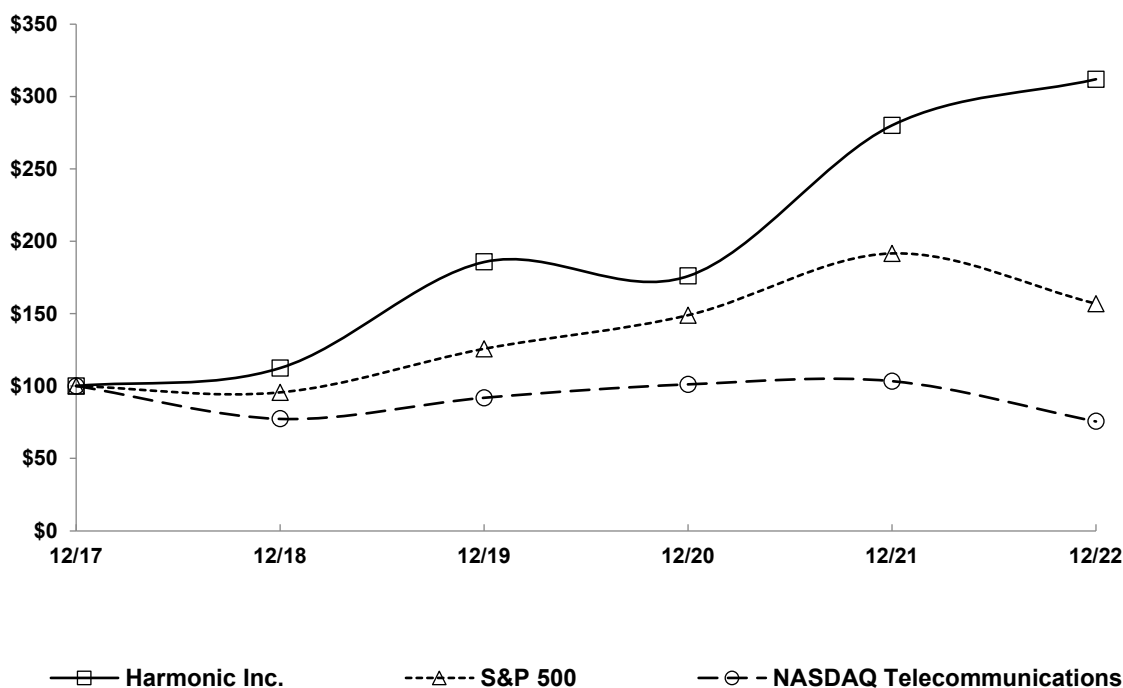
There were no repurchase activities during the three months ended December 31, 2022.

Stock Performance Graph

Set forth below is a line graph comparing the annual percentage change in the cumulative return to the stockholders of our common stock with the cumulative return of The NASDAQ Telecommunications Index and of the Standard & Poor's (S&P) 500 Index for the period commencing December 31, 2017 and ending on December 31, 2022. The graph assumes that \$100 was invested in each of the Company's common stock, the S&P 500 and The NASDAQ Telecommunications Index on December 31, 2017, and assumes the reinvestment of dividends, if any. The comparisons shown in the graph below are based upon historical data. Harmonic cautions that the stock price performance shown in the graph below is not indicative of, nor intended to forecast, the potential future performance of the Company's common stock.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*

Among Harmonic Inc., the S&P 500 Index
and the NASDAQ Telecommunications Index



*\$100 invested on 12/31/17 in stock or index, including reinvestment of dividends.
Fiscal year ending December 31.

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	12/17	12/18	12/19	12/20	12/21	12/22
Harmonic Inc.	100.00	112.38	185.71	175.95	280.00	311.90
S&P 500	100.00	95.62	125.72	148.85	191.58	156.89
NASDAQ Telecom	100.00	77.39	91.90	101.16	103.32	75.55

The information contained in this Stock Performance Graph section shall not be deemed to be "soliciting material," "filed" or incorporated by reference in previous or future filings with the SEC, or subject to the liabilities of Section 18 of the Exchange Act, except to the extent that Harmonic specifically incorporates it by reference into a document filed under the Securities Act or the Exchange Act.

Item 6. ***[RESERVED]***

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

The following discussion should be read in conjunction with the consolidated financial statements and the related notes. 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, but are not limited to, those discussed below and those listed under Item 1A, Risks Factors. For discussion of comparison of our results of operations and cash flows for the fiscal years ended December 31, 2021 and 2020, refer to Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations, of our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, filed with the SEC on February 28, 2022.

Business Overview

We are a leading global provider of (i) versatile and high performance video delivery software, products, system solutions and services that enable our customers to efficiently create, prepare, store, playout and deliver a full range of high-quality broadcast and streaming video services to consumer devices, including televisions, personal computers, laptops, tablets and smart phones and (ii) broadband solutions that enable broadband operators to more efficiently and effectively deploy high-speed internet, for data, voice and video services to consumers' homes.

We classify our total revenue in two categories, "Appliance and integration" and "SaaS and service." The "Appliance and integration" revenue category includes hardware, licenses and professional services and is reflective of non-recurring revenue, while the "SaaS and service" category includes usage fees for our SaaS platform and support service revenue from our appliance-based customers and reflects our recurring revenue stream.

We conduct business in three geographic regions - the Americas, EMEA and APAC - and operate in two segments, Video and Broadband. During the third quarter of fiscal 2022, our Cable Access segment was renamed the Broadband segment to reflect a broader strategic view of the category. There has been no change to the composition of the segment; therefore, no prior periods were restated. Our Video business sells video processing, production and playout solutions, and services worldwide to broadband operators and satellite and telecommunications ("telco") Pay-TV service providers, which we refer to collectively as "service providers," as well as to broadcast and media companies, including streaming media companies. Our Video business infrastructure solutions are delivered either through shipment of our products, software licenses or as SaaS subscriptions. Our Broadband business sells broadband access solutions and related services, including our CableOS software-based broadband access solution, to broadband operators globally.

Historically, our revenue has been dependent upon spending in the cable, satellite, telco, broadcast and media industries, including streaming media. Our customers' spending patterns are dependent on a variety of factors, including but not limited to: economic conditions in the United States and international markets, including the impacts of the COVID-19 pandemic and the Russia-Ukraine conflict, such as inflation, rising interest rates, potential supply chain disruptions, volatility in capital markets and foreign currency fluctuations; access to financing; annual budget cycles of each of the industries we serve; impact of industry consolidations; and customers suspending or reducing spending in anticipation of new products or new standards, new industry trends and/or technology shifts. If our product portfolio and product development plans do not position us well to capture an increased portion of the spending in the markets in which we compete, our revenue may decline. As we attempt to further diversify our customer base in these markets, we may need to continue to build alliances with other equipment manufacturers and suppliers, cloud service providers, content providers, resellers and system integrators, managed services providers and software developers; adapt our products for new applications; take orders at prices resulting in lower margins; and build internal expertise to handle the particular operational, payment, financing and/or contractual demands of our customers, which could result in higher operating costs for us.

More recently, the United States has experienced high levels of inflation, which may result in decreased demand for our products and services, increases in our operating costs including our labor costs, constrained credit and liquidity, reduced customer spending and volatility in financial markets. The Federal Reserve has raised, and may continue to raise, interest rates in response to concerns over inflation risk. There continues to be uncertainty in the changing market and economic conditions, including the possibility of additional measures that could be taken by the Federal Reserve and other government agencies, related to macroeconomic conditions, geopolitical disruptions and concerns over inflation risk.

We believe a material and growing portion of the opportunities for our Video business are linked to the industry and our customers (i) continuing to adopt streaming technologies to capture, process and deliver video content to consumers and, increasingly, utilizing public cloud solutions like our VOS SaaS platform to do so; (ii) transforming existing broadcast infrastructure workflows into more flexible, efficient and cost-effective operations running in public clouds; and (iii) for those customers maintaining on-premise video delivery infrastructure, continuing to upgrade and replace aging equipment with next-generation software-based appliances that significantly reduce operational complexity. Our Video business strategy is focused on continuing to develop and deliver products, solutions and services to enable and support these trends.

Our Broadband strategy is focused on continuing to develop and deliver software-based broadband access technologies, which we refer to as our CableOS solutions, to our broadband operator customers. We believe our CableOS software-based broadband access solutions are superior to hardware-based systems and deliver unprecedented scalability, agility and cost savings for our customers. Our CableOS solutions, which can be deployed based on a centralized, DAA or hybrid architecture, enable our customers to migrate to multi-gigabit broadband capacity and the fast deployment of DOCSIS and/or FTTH data, video and voice services. We believe our CableOS solutions resolve space and power constraints in broadband operator facilities, eliminate dependence on hardware upgrade cycles and significantly reduce total cost of ownership, and are helping us become a major player in the broadband access market. In the meantime, we believe our Broadband segment will continue to gain momentum in the marketplace as our customers adopt and deploy our virtualized DOCSIS, CMTS and FTTH solutions and distributed access architectures. We continue to make progress in the development of our CableOS solutions and in the growth of our CableOS business, with expanded commercial deployments, field trials, and customer engagements.

Critical Accounting Estimates

The preparation of consolidated financial statements and related disclosures, which are prepared in accordance with GAAP, requires Harmonic to make judgments, assumptions and estimates that affect the reported amounts of assets and liabilities, the disclosure of contingencies and the reported amounts of revenue and expenses in the financial statements and accompanying notes. We evaluate our estimates and assumptions on an ongoing basis. Our estimates are based on historical experience and various other assumptions we believe to be reasonable under the circumstances. Material differences may result in the amount and timing of revenue and expenses if different judgments or different estimates were made. Refer to Note 2 of the Notes to our Consolidated Financial Statements for details of our accounting estimates.

We believe that the following critical accounting estimates involve a greater degree of judgement or complexity than our other accounting estimates. Accordingly, the critical accounting estimates that we believe have the most significant impact on Harmonic's financial statements are set forth below:

- Revenue recognition;
- Valuation of inventories; and
- Accounting for income taxes.

Revenue Recognition

We recognize revenue from contracts with customers using the following five steps:

- a) Identify the contract(s) with a customer;
- b) Identify the performance obligations in the contract;
- c) Determine the transaction price;
- d) Allocate the transaction price to the performance obligations in the contract; and
- e) Recognize revenue when (or as) we satisfy a performance obligation.

Refer to Note 4, "Revenue," of the Notes to our Consolidated Financial Statements for additional information about our revenue recognition policies, including critical judgments and estimates associated with our revenue recognition.

Valuation of Inventories

We state inventories at the lower-of-cost (determined on first-in, first-out basis) or net realizable value. We write down the cost of excess or obsolete inventory to net realizable value based on future demand forecasts and historical consumption. If there were to be a sudden and significant decrease in demand for our products, or if there were a higher incidence of inventory obsolescence because of rapidly changing technology and customer requirements, we could be required to record additional charges for excess and obsolete inventory and our gross margin could be adversely affected. Inventory management is of critical importance in order to balance the need to maintain strategic inventory levels to ensure competitive lead times against the risk of inventory obsolescence because of rapidly changing technology and customer requirements.

Accounting for Income Taxes

In preparing our consolidated financial statements, we estimate our income taxes for each of the jurisdictions in which we operate. This involves estimating our actual current tax expense and assessing temporary differences resulting from differing treatment of items, such as reserves and accruals, for tax and accounting purposes. These temporary differences result in deferred tax assets and liabilities, which are included within our Consolidated Balance Sheets. We maintain valuation allowances for deferred tax assets when it is likely that all or a portion of a deferred tax asset will not be realized. In determining whether a valuation allowance is warranted, we take into account such factors as prior earnings history, expected future earnings, unsettled circumstances that, if unfavorably resolved, would adversely affect the utilization of a deferred tax asset.

We are subject to examination of our income tax returns by various tax authorities on a periodic basis. We regularly assess the likelihood of adverse outcomes resulting from such examinations to determine the adequacy of our provision for income taxes. We apply the provisions of the applicable accounting guidance regarding accounting for uncertainty in income taxes, which requires application of a more-likely-than-not threshold to the recognition and derecognition of uncertain tax positions. If the recognition threshold is met, the applicable accounting guidance permits us to recognize a tax benefit measured at the largest amount of such tax benefit that, in our judgment, is more than fifty percent likely to be realized upon settlement. It further requires that a change in judgment related to the expected ultimate resolution of uncertain tax positions be recognized in earnings in the period in which such determination is made.

We file annual income tax returns in multiple taxing jurisdictions around the world. A number of years may elapse before an uncertain tax position is audited and finally resolved. While it is often difficult to predict the final outcome or the timing of resolution of any particular uncertain tax position, we believe that our reserves for income taxes reflect the most likely outcome. We adjust these reserves, as well as the related interest and penalties, in light of changing facts and circumstances. If our estimate of tax liabilities proves to be less than the ultimate assessment, a further charge to expense would result. If payment of these amounts ultimately proves to be unnecessary, the reversal of the liabilities would result in tax benefits being recognized in the period when we determine the liabilities are no longer necessary. Any changes in estimate, or settlement of any particular position, could have a material impact on our operating results, financial condition and cash flows.

Results of Operations

Net Revenue

The following table presents the breakdown of net revenue by category and geographical region:

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Appliance and integration	\$ 473,806	\$ 369,767	\$ 252,014	\$ 104,039	28 %	\$ 117,753	47 %
as % of total net revenue	76 %	73 %	67 %				
SaaS and service	151,151	137,382	126,817	13,769	10 %	10,565	8 %
as % of total net revenue	24 %	27 %	33 %				
Total net revenue	<u>\$ 624,957</u>	<u>\$ 507,149</u>	<u>\$ 378,831</u>	<u>\$ 117,808</u>	23 %	<u>\$ 128,318</u>	34 %
Americas	\$ 452,869	\$ 335,731	\$ 219,394	\$ 117,138	35 %	\$ 116,337	53 %
as % of total net revenue	73 %	66 %	58 %				
EMEA	133,095	126,427	117,126	6,668	5 %	9,301	8 %
as % of total net revenue	21 %	25 %	31 %				
APAC	38,993	44,991	42,311	(5,998)	(13)%	2,680	6 %
as % of total net revenue	6 %	9 %	11 %				
Total net revenue	<u>\$ 624,957</u>	<u>\$ 507,149</u>	<u>\$ 378,831</u>	<u>\$ 117,808</u>	23 %	<u>\$ 128,318</u>	34 %

Appliance and integration net revenue increased in 2022, as compared to 2021, primarily due to an increase in our Broadband segment net revenue as a result of continued penetration of existing Broadband customers and new Broadband customer deployments. The increase was partially offset by a decrease in our Video segment net revenue, which was primarily due to a reduction in sales of Appliance products and the impact of ceasing sales activities in Russia.

SaaS and service net revenue increased in 2022, as compared to 2021, primarily due to increasing usage from existing customers and activation of new SaaS customers.

Americas net revenue increased in 2022, as compared to 2021, primarily due to increased penetration of existing Broadband customers and addition of new Broadband customer deployments.

EMEA net revenue increased in 2022, as compared to 2021, primarily due to continued expansion of customer deployments of our Broadband segment. APAC net revenue decreased in 2022, as compared to 2021, mainly due to a reduction in sales of Video Appliance products.

Gross Profit

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Gross profit	\$ 315,884	\$ 259,742	\$ 194,997	\$ 56,142	22%	\$ 64,745	33%
as % of total net revenue ("gross margin")	50.5 %	51.2 %	51.5 %	(0.7)%		(0.3)%	

Our gross margins are dependent upon, among other factors, the proportion of software sales, product mix, supply chain impacts, customer mix, product introduction costs, price reductions granted to customers and achievement of cost reductions.

Our gross margin decreased in 2022, as compared to 2021, primarily due to increased mix of Broadband segment revenue as a portion of total company revenue.

Research and Development Expenses

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Research and development	\$ 120,307	\$ 102,231	\$ 82,494	\$ 18,076	18 %	\$ 19,737	24 %
as % of total net revenue	19 %	20 %	22 %				

Our research and development expenses consist primarily of employee salaries and related expenses, contractors and outside consultants, supplies and materials, equipment depreciation and facilities costs, all of which are associated with the design and development of new products and enhancements of existing products. The research and development expenses are net of French Research and Development credits.

Research and development expenses increased in 2022, as compared to 2021, primarily due to higher employee compensation costs as a result of headcount increases and annual compensation adjustments to support the growth of our Broadband business and the strategic transition of our Video segment to SaaS business.

Selling, General and Administrative Expenses

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Selling, general and administrative	\$ 146,717	\$ 138,085	\$ 119,611	\$ 8,632	6 %	\$ 18,474	15 %
as % of total net revenue	23 %	27 %	32 %				

Selling, general and administrative expenses increased in 2022, as compared to 2021, primarily due to higher employee compensation costs as a result of headcount increases and annual compensation adjustments.

Amortization of Intangibles

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Amortization of intangibles	\$ —	\$ 507	\$ 3,019	\$ (507)	(100)%	\$ (2,512)	(83)%

There was no amortization of intangibles expense in 2022, as intangible assets were fully amortized during the first quarter of fiscal 2021.

Restructuring and Related Charges

We have implemented several restructuring plans in the past few years. The goal of these plans is to bring operational expenses to appropriate levels relative to our net revenues, while simultaneously implementing extensive company-wide expense control programs. We account for our restructuring plans under the authoritative guidance for exit or disposal activities. The restructuring and related charges are included in “Cost of revenue” and “Operating expenses-restructuring and related charges” in the Consolidated Statements of Operations.

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Cost of revenue	\$ 533	\$ 571	\$ 1,094	\$ (38)	(7)%	\$ (523)	(48)%
Operating expenses							
Restructuring and related charges	3,341	110	2,322	3,231	2,937 %	(2,212)	(95)%
Total restructuring and related charges	\$ 3,874	\$ 681	\$ 3,416	\$ 3,193	469 %	\$ (2,735)	(80)%

Restructuring and related charges increased in 2022, as compared to 2021, primarily due to higher severance and employee benefit costs recorded in conjunction with restructuring activities in fiscal 2022, including the impact of ceasing operations in China and Russia.

Refer to Note 11, “Restructuring and Related Charges,” of the Notes to our Consolidated Financial Statements for additional information.

Interest Expense, Net

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Interest expense, net	\$ (5,040)	\$ (10,625)	\$ (11,509)	\$ 5,585	(53)%	\$ 884	(8)%

Interest expense, net decreased in 2022, as compared to 2021, primarily due to the adoption of ASU 2020-06, Accounting for Convertible Instruments and Contracts in an Entity’s Own Equity, on January 1, 2022, which eliminated debt discounts on the 2022 Notes and 2024 Notes resulting in an elimination of debt discount amortization expense. Refer to Note 2, “Recently Issued Accounting Pronouncements,” of the Notes to our Consolidated Financial Statements for details of the ASU adoption. The decrease is also attributed to the repayment of the 2022 Notes in December 2022 upon their maturity.

Loss on Convertible Debt Extinguishment

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Loss on convertible debt extinguishment	\$ —	\$ —	\$ (1,362)	\$ —	n/a	\$ 1,362	(100)%

The loss on convertible debt extinguishment of \$1.4 million in 2020 includes \$0.9 million loss related to the exchange of a portion of the 2020 Notes in June 2020 and a \$0.5 million loss related to the settlement of the remaining 2020 Notes in December 2020. Refer to Note 12, “Convertible Notes and Other Debts,” of the Notes to our Consolidated Financial Statements for additional information.

Other Income (Expense), Net

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Other income (expense), net	\$ 4,006	\$ 687	\$ (897)	\$ 3,319	483 %	\$ 1,584	(177)%

Other income (expense), net is primarily comprised of foreign exchange gains and losses on cash, accounts receivable and intercompany balances denominated in currencies other than the functional currency of the reporting entity. Our foreign currency exposure is primarily driven by the fluctuations in the foreign currency exchanges rates of the Euro, British pound, Japanese yen and Israeli shekel. The change in other income (expense), net in 2022, as compared to 2021, was primarily due to a gain of \$4.2 million recognized on the sale of our investment in Encoding.com in May 2022. Refer to Note 3, “Investment in Equity Securities,” of the Notes to our Consolidated Financial Statements for details on the sale of investment in Encoding.com.

Income Taxes

(in thousands, except percentages)	Year ended December 31,			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020				
Provision for (benefit from) income taxes	\$ 16,303	\$ (4,383)	\$ 3,054	\$ 20,686	(472)%	\$ (7,437)	(244)%

The change in provision for (benefit from) income taxes for 2022, as compared to 2021, was primarily due to mandatory capitalization and amortization of research and development expenses in the United States starting January 1, 2022, as required by the Tax Cuts and Jobs Act, which resulted in additional income tax in the United States, offset by the utilization of net operating losses and tax credits. In 2021 there was a valuation allowance release of \$8.6 million in a foreign jurisdiction in recognition of their improved historical earnings and increasing future projected earnings which contributed to the tax benefit recognized for fiscal 2021.

Segment Financial Results

(in thousands, except percentages)	Year ended December 31,											
	2022	2021	2020	2022 vs. 2021		2021 vs. 2020						
Video												
Revenue	\$	274,189	\$	288,507	\$	242,510	\$	(14,318)	(5)%	\$	45,997	19 %
as % of total revenue		44%		57%		64 %		(13)%			(7)%	
Gross profit		165,618		169,468		132,092		(3,850)	(2)%		37,376	28 %
Gross margin %		60%		59%		54 %		1%			5%	
Operating income		22,322		28,460		1,326		(6,138)	(22)%		27,134	2,046 %
Operating margin %		8 %		10 %		1 %		(2)%			9 %	
Broadband												
Revenue	\$	350,768	\$	218,642	\$	136,321	\$	132,126	60 %	\$	82,321	60 %
as % of total revenue		56%		43%		36 %		13%			7%	
Gross profit		153,031		93,191		66,661		59,840	64 %		26,530	40 %
Gross margin %		44%		43%		49 %		1%			(6)%	
Operating income		52,283		15,599		11,651		36,684	235 %		3,948	34 %
Operating margin %		15 %		7 %		9 %		8%			(2)%	
Total												
Revenue	\$	624,957	\$	507,149	\$	378,831	\$	117,808	23 %	\$	128,318	34 %

Video

Our Video segment net revenue decreased in 2022, as compared to 2021, primarily due to a reduction in sales of Appliance products, reflecting lower shipments of appliance products and the impact of ceasing sales activities in Russia, partially offset by an increase in SaaS and service revenue, reflecting increasing usage from existing customers and activation of new SaaS customers. Video segment operating margin decreased in 2022, as compared to 2021, primarily due to the decrease in revenue and increased investment in research and development to support strategic transition to the SaaS business, partially offset by gross margin expansion in SaaS and Appliance.

Broadband

Our Broadband segment net revenue increased in 2022, as compared to 2021, primarily due to the increased penetration of our existing customers and new customer deployments in 2022. Our Broadband segment operating margin increased in 2022, as compared to 2021, primarily due to the increase in revenue and margin expansion driven by favorable mix and cost savings in freight and shipping as a result of strategic investments in inventory.

Liquidity and Capital Resources

We expect to continue to manage our cash from operations effectively, together with deploying cash in working capital for growth. The cash we generate from our operations enables us to fund ongoing operations, our research and development projects for new products and technologies, and other business activities. We continually evaluate our cash needs and may decide it is best to raise additional capital or seek alternative financing sources to fund our operations, the growth of our business, to take advantage of unanticipated strategic opportunities, or to strengthen our financial position, including through drawdowns on existing or new debt facilities or new financing (debt and equity) funds. In the future, we may enter into other arrangements for potential investments in, or acquisitions of, complementary businesses, services or technologies, which could require us to seek additional equity or debt financing. Additional funds may not be available on terms favorable to us or at all. Conversely, we may also from time to time determine that it is in our best interests to voluntarily repay certain indebtedness early. We repaid \$37.7 million of principal in cash of the 2022 Notes upon maturity in December 2022. We believe that our current sources of funds will provide us with adequate liquidity during the 12-month period following December 31, 2022, as well as in the long-term.

Material Cash Requirements

Our principal uses of cash will include repayments of debt and related interest, purchases of inventory, stock repurchases, payments for payroll, restructuring expenses, and other operating expenses related to the development and marketing of our products, purchases of property and equipment, facility leases, and other contractual obligations for the foreseeable future.

As of December 31, 2022, we had outstanding \$131.4 million in aggregate principal amount of indebtedness, consisting of our 2024 Notes and other debts, of which \$4.8 million is scheduled to become due in the 9-month period following December 31, 2022. As of December 31, 2022, our total minimum lease payments are \$37.6 million, of which \$7.1 million is due in the 12-month period following December 31, 2022. For details regarding our indebtedness and lease obligations, refer to Note 12, “Convertible Notes and Other Debts”, and Note 5, “Leases”, respectively, of the Notes to our Consolidated Financial Statements included elsewhere in this Annual Report on Form 10-K.

On February 3, 2022, the Board of Directors authorized us to repurchase, from time to time, up to \$100 million of our outstanding shares of common stock through February 2025, at such time and such prices as management may decide. The program does not obligate us to repurchase any specific number of shares and may be discontinued at any time. As of December 31, 2022, approximately \$94.9 million of the share repurchase authorization remained available.

Sources and Conditions of Liquidity

Our sources to fund our material cash requirements are predominantly from our sales of our products and services and, when applicable, proceeds from debt facilities and debt and equity offerings.

As of December 31, 2022, our principal sources of liquidity consisted of cash and cash equivalents of \$89.6 million, net accounts receivable of \$108.4 million, and our \$25.0 million revolving credit facility with JPMorgan Chase Bank, N.A. Refer to Note 12, “Convertible Notes and Other Debts,” of the Notes to our Consolidated Financial Statements for details of the Credit Agreement.

Our cash and cash equivalents of \$89.6 million as of December 31, 2022 consisted of bank deposits held throughout the world, of which \$67.7 million was held outside of the United States. At present, such foreign funds are considered to be indefinitely reinvested in foreign countries to the extent of indefinitely reinvested foreign earnings. In the event funds from foreign operations are needed to fund cash needs in the United States and if U.S. taxes have not already been previously accrued, we may be required to accrue and pay additional U.S. and foreign withholding taxes in order to repatriate these funds.

Summary of Cash Flows

(in thousands)	Year ended December 31,		
	2022	2021	2020
Net cash provided by (used in)			
Operating activities	\$ 5,476	\$ 41,017	\$ 39,163
Investing activities	(1,288)	(12,975)	(32,205)
Financing activities	(43,133)	7,939	(2,109)
Effect of exchange rate changes on cash and cash equivalents	(4,900)	(1,195)	738
Net increase (decrease) in cash, cash equivalents and restricted cash	\$ (43,845)	\$ 34,786	\$ 5,587

Operating Activities

Net cash provided by operating activities decreased \$35.5 million in 2022, as compared to 2021, primarily due to an increase of cash used for working capital mainly due to timing of accounts payable and investments in inventories, partially offset by higher net income in fiscal 2022.

We expect that cash provided by or used in operating activities may fluctuate in future periods as a result of a number of factors, including but not limited to, the impact of COVID-19, the Russia-Ukraine conflict and related macroeconomic conditions on demand for our offerings, fluctuations in our operating results, shipment linearity, accounts receivable collections performance, inventory and supply chain management, and the timing and amount of compensation and other payments.

Investing Activities

Net cash used in investing activities decreased \$11.7 million in 2022, as compared to 2021, primarily due to proceeds from the sale of our investment in Encoding.com and lower purchases of property and equipment in fiscal 2022.

Financing Activities

Net cash used in financing activities increased \$51.1 million in 2022 compared to 2021, primarily due to the repayment of the \$37.7 million principal of the 2022 Notes in December 2022, lower proceeds from issuance of common stock to employees through stock option exercises, and stock repurchase transactions initiated in fiscal 2022.

New Accounting Pronouncements

Refer to Note 2 of the accompanying Consolidated Financial Statements for a full description of recent accounting pronouncements, including the dates of adoption and estimated effects, if any, on results of operations and financial condition.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.**Foreign Currency Exchange Risk**

We market and sell our products and services through our direct sales force and indirect channel partners in North America, EMEA, APAC and Latin America. Accordingly, we are subject to exposure from adverse movements in foreign currency exchange rates, primarily the Euro, British pound, Israeli shekel and Japanese yen. Our U.S. dollar functional subsidiaries account for approximately 97%, 96% and 95% of our consolidated net revenues in 2022, 2021 and 2020, respectively. We recorded net billings denominated in foreign currencies of approximately 15%, 18% and 22% of total company billings in 2022, 2021 and 2020, respectively. In addition, a portion of our operating expenses, primarily the cost of personnel to deliver technical support on our products and professional services, sales and sales support and research and development, are denominated in foreign currencies, primarily the Euro, Israeli shekel and British pound.

We use derivative instruments, primarily forward contracts, to manage exposures to foreign currency exchange rates and we do not enter into foreign currency forward contracts for trading purposes.

Derivatives Not Designated as Hedging Instruments (Balance Sheet Hedges)

We enter into forward currency contracts to hedge foreign currency denominated monetary assets and liabilities. These derivative instruments are marked to market through earnings every period and mature generally within three months. Changes in the fair value of these foreign currency forward contracts are recognized in “Other income (expense), net” in the Consolidated Statements of Operations, and are largely offset by the changes in the fair value of the assets or liabilities being hedged.

The U.S. dollar equivalents of all outstanding notional amounts of foreign currency forward contracts are summarized as follows:

(in thousands)	December 31,	
	2022	2021
Derivatives not designated as hedging instruments:		
Purchase	\$ 7,971	\$ 2,926
Sell	\$ —	\$ 5,175

Interest Rate Risk

Our exposure to market risk for changes in interest rates relates primarily to our outstanding debt arrangements with variable rate interests as well as our borrowings under the Credit Agreement.

On December 19, 2019, we entered into a Credit Agreement with JPMorgan Chase Bank, N.A. as lender, and Harmonic International GmbH, as co-borrower. The Credit Agreement provides for a secured revolving loan facility in an aggregate principal amount of up to \$25.0 million, based on a borrowing base of eligible accounts receivable and inventory. On October 28, 2022, we amended the Credit Agreement to (i) extend the Credit Agreement maturity date to October 28, 2025, or subject to certain exceptions, the date that is 90 days prior to the maturity date of our 2024 Notes (to the extent the 2024 Notes remain outstanding as of such date) and (ii) amend the interest rate provisions to replace LIBOR with SOFR as the interest rate benchmark for the revolving loans. As amended, the revolving loans bear interest, at our election, at a floating rate per annum equal to either (1) 2.00% plus the greater of (i) 2.50% and (ii) the prime rate as reported in the Wall Street Journal from time to time or (2) 3.00% plus adjusted term SOFR for an interest period of one, three or six months. Except in cases of default, prepayment or conversion, Interest on the revolving loans is payable monthly in arrears, in the case of prime rate loans, and at the end of the applicable interest period, in the case of SOFR loans. We had no revolving borrowings under the Credit Agreement from the closing of the Credit Agreement through December 31, 2022.

For our French entity, the aggregate debt balance at December 31, 2022 was \$15.9 million, which are financed by French government agencies. These debt instruments have maturities ranging from one to five years, expiring from 2023 through 2026. These loans are tied to the 1-month EURIBOR rate plus spread. Refer to Note 12, “Convertible Notes and Other Debts,” of the Notes to our Consolidated Financial Statements for additional information. As of December 31, 2022, a hypothetical 1.0% increase in interest rates on our debts subject to variable interest rate fluctuations would increase our interest expense by approximately \$0.2 million annually.

As of December 31, 2022, we had \$115.5 million aggregate principal of the 2024 Notes outstanding, which have a fixed 2.00% coupon rate. Additionally, during fiscal 2020, we received a loan from Société Générale S.A. in France which bears an effective interest rate of 0.51% per annum, in connection with relief loan programs related to the COVID-19 pandemic. As of December 31, 2022, the outstanding balance of this loan was \$5.3 million.

Item 8. *FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA*

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Harmonic, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Harmonic, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive income, stockholders' equity and cash flows for each of the two years in the period ended December 31, 2022, 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, 2022 and 2021, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 28, 2023, expressed an unqualified opinion thereon.

Basis for Opinion

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

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

Critical Audit Matter

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

Inventory Valuation

Description of the Matter

The Company's net inventory totaled \$121 million as of December 31, 2022. As explained in "Note 2: Accounting Policies" within the consolidated financial statements, inventory is stated at the lower of cost (determined on a first-in, first-out basis) or net realizable value. The Company establishes a provision for excess and obsolete inventory to reduce such inventory to its estimated net realizable value.

Auditing management's estimates for excess and obsolete inventory involved auditor judgment due to the assessment of management's estimates of whether a provision for excess and obsolete inventory is required. The measurement of any excess of cost over net realizable value is judgmental and is impacted by a number of factors that are affected by general economic and market conditions outside the Company's control. Specifically, excess and obsolete inventory calculations are sensitive to assumptions that relate to future customer demand for the Company's products.

*How We Addressed the Matter
in Our Audit*

We obtained an understanding, evaluated the design and tested the operating effectiveness of internal controls over the Company's excess and obsolete inventory reserve process. This included controls over management's determination of inventory valuation, including the evaluation of future demand of the Company's products and the completeness and accuracy of the data underlying the excess and obsolete inventory valuation.

We performed audit procedures that included, among others, assessing the Company's methodology over the computation of the provision for excess and obsolete inventory, testing the significant assumptions and the underlying inputs used by the Company in its analysis including historical sales trends, expectations regarding future demand, changes in the Company's business, customer base, product life cycles and other relevant factors. We evaluated current inventory levels compared to future demand and historical sales.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2021.

San Jose, California

February 28, 2023

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Harmonic, Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Harmonic, Inc.'s internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Harmonic, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the 2022 Consolidated Financial Statements of the Company and our report dated February 28, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

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

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ Ernst & Young LLP

San Jose, California

February 28, 2023

HARMONIC INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except per share data)

	December 31,	
	2022	2021
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 89,586	\$ 133,431
Accounts receivable, net	108,427	88,529
Inventories	120,949	71,195
Prepaid expenses and other current assets	26,337	29,972
Total current assets	345,299	323,127
Property and equipment, net	39,814	42,721
Operating lease right-of-use assets	25,469	30,968
Goodwill	237,739	240,213
Other non-current assets	61,697	56,657
Total assets	\$ 710,018	\$ 693,686
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Convertible debt, current	\$ 113,981	\$ 36,824
Other debts, current	4,756	4,992
Accounts payable	67,455	64,429
Deferred revenue	62,383	57,226
Operating lease liabilities, current	6,773	7,346
Other current liabilities	66,724	53,644
Total current liabilities	322,072	224,461
Convertible debt, non-current	—	98,941
Other debts, non-current	11,161	12,989
Operating lease liabilities, non-current	24,110	29,120
Other non-current liabilities	28,169	31,379
Total liabilities	385,512	396,890
Commitments and contingencies (Note 18)		
Convertible debt (Note 12)	—	883
Stockholders' equity:		
Preferred stock, \$0.001 par value, 5,000 shares authorized; no shares issued or outstanding	—	—
Common stock, \$0.001 par value, 150,000 shares authorized; 109,871 and 102,959 shares issued and outstanding at December 31, 2022 and 2021, respectively	110	103
Additional paid-in capital	2,380,651	2,387,039
Accumulated deficit	(2,046,569)	(2,087,957)
Accumulated other comprehensive loss	(9,686)	(3,272)
Total stockholders' equity	324,506	295,913
Total liabilities and stockholders' equity	\$ 710,018	\$ 693,686

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

HARMONIC INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except per share data)

	Year ended December 31,		
	2022	2021	2020
Revenue:			
Appliance and integration	\$ 473,806	\$ 369,767	\$ 252,014
SaaS and service	151,151	137,382	126,817
Total net revenue	624,957	507,149	378,831
Cost of revenue:			
Appliance and integration	259,027	195,445	126,948
SaaS and service	50,046	51,962	56,886
Total cost of revenue	309,073	247,407	183,834
Total gross profit	315,884	259,742	194,997
Operating expenses:			
Research and development	120,307	102,231	82,494
Selling, general and administrative	146,717	138,085	119,611
Amortization of intangibles	—	507	3,019
Restructuring and related charges	3,341	110	2,322
Total operating expenses	270,365	240,933	207,446
Income (loss) from operations	45,519	18,809	(12,449)
Interest expense, net	(5,040)	(10,625)	(11,509)
Loss on convertible debt extinguishment	—	—	(1,362)
Other income (expense), net	4,006	687	(897)
Income (loss) before income taxes	44,485	8,871	(26,217)
Provision for (benefit from) income taxes	16,303	(4,383)	3,054
Net income (loss)	\$ 28,182	\$ 13,254	\$ (29,271)
Net income (loss) per share:			
Basic	\$ 0.27	\$ 0.13	\$ (0.30)
Diluted	\$ 0.25	\$ 0.12	\$ (0.30)
Weighted average common shares:			
Basic	105,080	101,484	96,971
Diluted	112,378	106,171	96,971

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

HARMONIC INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(In thousands)

	Year ended December 31,		
	2022	2021	2020
Net income (loss)	\$ 28,182	\$ 13,254	\$ (29,271)
Other comprehensive income (loss):			
Defined benefit plan	626	(233)	(159)
Translation gain (loss)	(6,956)	(8,022)	8,279
Other comprehensive income (loss) before tax	(6,330)	(8,255)	8,120
Provision for (benefit from) income taxes	84	873	(801)
Other comprehensive income (loss), net of tax	(6,414)	(9,128)	8,921
Total comprehensive income (loss)	<u>\$ 21,768</u>	<u>\$ 4,126</u>	<u>\$ (20,350)</u>

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

HARMONIC INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2019	91,875	\$ 92	\$ 2,327,359	\$ (2,071,940)	\$ (3,065)	\$ 252,446
Net loss	—	—	—	(29,271)	—	(29,271)
Other comprehensive income, net of tax	—	—	—	—	8,921	8,921
Issuance of common stock under stock option, award and purchase plans	3,822	3	3,807	—	—	3,810
Stock-based compensation	—	—	18,034	—	—	18,034
Exercise of warrant	2,413	2	(2)	—	—	—
Reclassification from mezzanine equity to equity for 2020 Notes	—	—	2,410	—	—	2,410
Conversion feature of 2022 Notes	—	—	8,254	—	—	8,254
Conversion feature of exchanged portion of 2020 Notes	—	—	(6,909)	—	—	(6,909)
Issuance of common stock upon conversion of 2020 Notes	94	1	606	—	—	607
Balance at December 31, 2020	98,204	\$ 98	\$ 2,353,559	\$ (2,101,211)	\$ 5,856	\$ 258,302
Net income	—	—	—	13,254	—	13,254
Other comprehensive loss, net of tax	—	—	—	—	(9,128)	(9,128)
Issuance of common stock under stock option, award and purchase plans	4,755	5	10,244	—	—	10,249
Stock-based compensation	—	—	24,119	—	—	24,119
Reclassification from equity to mezzanine equity for 2022 Notes	—	—	(883)	—	—	(883)
Balance at December 31, 2021	102,959	\$ 103	\$ 2,387,039	\$ (2,087,957)	\$ (3,272)	\$ 295,913
Cumulative effect of ASU 2020-06 adoption	—	—	(32,249)	18,339	—	(13,910)
Balance at January 1, 2022	102,959	103	2,354,790	(2,069,618)	(3,272)	282,003
Net income	—	—	—	28,182	—	28,182
Other comprehensive loss, net of tax	—	—	—	—	(6,414)	(6,414)
Issuance of common stock under stock option, award and purchase plans, net	3,601	4	787	—	—	791
Repurchase of common stock	(571)	(1)	—	(5,133)	—	(5,134)
Stock-based compensation	—	—	25,078	—	—	25,078
Issuance of common stock upon conversion of 2022 Notes	3,882	4	(4)	—	—	—
Balance at December 31, 2022	109,871	\$ 110	\$ 2,380,651	\$ (2,046,569)	\$ (9,686)	\$ 324,506

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

HARMONIC INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Year ended December 31,		
	2022	2021	2020
Cash flows from operating activities:			
Net income (loss)	\$ 28,182	\$ 13,254	\$ (29,271)
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	12,260	12,546	11,737
Amortization of intangibles	—	507	3,970
Stock-based compensation	25,212	24,056	18,040
Amortization of convertible debt discount	1,171	6,308	7,058
Amortization of warrant	1,734	1,741	1,746
Foreign currency remeasurement	(2,685)	(5,126)	6,391
Loss on convertible debt extinguishment	—	—	1,362
Deferred income taxes, net	4,894	(6,197)	(105)
Provision for expected credit losses and returns	1,954	4,142	1,666
Provision for excess and obsolete inventories	5,988	3,460	1,847
Gain on sale of investment in equity securities	(4,370)	—	—
Other adjustments	513	181	409
Changes in operating assets and liabilities:			
Accounts receivable	(23,136)	(26,722)	21,186
Inventories	(54,431)	(39,338)	(8,195)
Other assets	(8,402)	(3,096)	11,556
Accounts payable	5,837	42,303	(18,173)
Deferred revenues	2,610	15,014	19,751
Other liabilities	8,145	(2,016)	(11,812)
Net cash provided by operating activities	5,476	41,017	39,163
Cash flows from investing activities:			
Proceeds from sale of investment	7,962	—	—
Purchases of property and equipment	(9,250)	(12,975)	(32,205)
Net cash used in investing activities	(1,288)	(12,975)	(32,205)
Cash flows from financing activities:			
Payment of convertible debt	(37,707)	—	(7,999)
Payment of convertible debt issuance costs	—	—	(672)
Proceeds from other debts	3,499	3,861	9,398
Repayment of other debts	(4,583)	(6,169)	(6,646)
Repurchase of common stock	(5,133)	—	—
Proceeds from common stock issued to employees	7,092	12,311	5,472
Taxes paid related to net share settlement of equity awards	(6,301)	(2,064)	(1,662)
Net cash provided by (used in) financing activities	(43,133)	7,939	(2,109)
Effect of exchange rate changes on cash and cash equivalents	(4,900)	(1,195)	738
Net increase (decrease) in cash and cash equivalents	(43,845)	34,786	5,587
Cash and cash equivalents, beginning of the year	133,431	98,645	93,058
Cash and cash equivalents, end of the year	\$ 89,586	\$ 133,431	\$ 98,645
Supplemental disclosure of cash flow information:			
Income tax payments (refunds), net	\$ 9,036	\$ 2,525	\$ (17)
Interest payments, net	\$ 3,796	\$ 4,095	\$ 4,221
Supplemental schedule of non-cash investing and financing activities:			
Capital expenditures incurred but not yet paid	\$ 1,075	\$ 751	\$ 1,155
Fair value of 2022 Notes used to settle 2020 Notes	\$ —	\$ —	\$ 44,357

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

HARMONIC INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1: DESCRIPTION OF BUSINESS

Harmonic Inc. (“Harmonic” or the “Company”) is a leading global provider of (i) versatile and high performance video delivery software, products, system solutions and services that enable our customers to efficiently create, prepare, store, playout and deliver a full range of high-quality broadcast and streaming video services to consumer devices, including televisions, personal computers, laptops, tablets and smart phones and (ii) broadband access solutions that enable broadband operators to more efficiently and effectively deploy high-speed internet, for data, voice and video services to consumers’ homes.

The Company operates in two segments, Video and Broadband. The Video business sells video processing and production and playout solutions and services worldwide to broadband operators and satellite and telecommunications (“telco”) pay-TV service providers, which are collectively referred to as “service providers,” and to broadcast and media companies, including streaming media companies. The Video business infrastructure solutions are delivered either through shipment of our products, software licenses or as software-as-a-service (“SaaS”) subscriptions. The Broadband business sells broadband access solutions and related services, including our CableOS software-based broadband access solution, to broadband operators globally.

NOTE 2: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The accompanying consolidated financial statements of Harmonic include the accounts of the Company and its wholly-owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation. The Company’s fiscal quarters are based on 13-week periods, except for the fourth quarter which ends on December 31.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. generally accepted accounting principles (“US GAAP”) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. The Company’s reported financial positions or results of operations may be materially different under changed conditions or when using different estimates and assumptions, particularly with respect to significant accounting policies. If estimates or assumptions differ from actual results, subsequent periods are adjusted to reflect more current information.

Cash and Cash Equivalents

All highly liquid investments with an original maturity of three months or less at the date of purchase are considered cash equivalents. The carrying amount of cash and cash equivalents approximates fair value because of the short maturity of those instruments.

Credit Risk and Major Customers/Supplier Concentration

Financial instruments which subject the Company to concentrations of credit risk consist primarily of cash, cash equivalents, and accounts receivable. Cash and cash equivalents are invested in short-term, highly liquid, investment-grade instruments, in accordance with the Company’s investment policy. The investment policy limits the amount of credit exposure to any one financial institution, commercial or governmental issuer.

The Company’s accounts receivable are derived from sales to worldwide cable, satellite, telco, and broadcast and media companies. The Company generally does not require collateral from its customers, and performs ongoing credit evaluations of its customers and provides for expected losses. The Company maintains an allowance for doubtful accounts based upon the expected collectability of its accounts receivable. One customer had a balance greater than 10% of the Company’s net accounts receivable balance as of December 31, 2022 and 2021. During the year ended December 31, 2022, 2021 and 2020, Comcast is the only customer accounted for more than 10% of the Company’s revenue.

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 sole source and limited source suppliers, the partial or complete loss of certain of these sources could have at least a temporary adverse effect on the Company’s results of operations and damage customer relationships.

Revenue Recognition

The Company's principal sources of revenue are from the sale of hardware, software, hardware and software maintenance contracts, and end-to-end solutions, encompassing design, manufacture, test, integration and installation of products. The Company also derives recurring revenue from subscriptions, which are comprised of subscription fees from customers utilizing the Company's cloud-based video processing solutions.

Revenue from contracts with customers is recognized using the following five steps:

- a) Identify the contract(s) with a customer;
- b) Identify the performance obligations in the contract;
- c) Determine the transaction price;
- d) Allocate the transaction price to the performance obligations in the contract; and
- e) Recognize revenue when (or as) the Company satisfies a performance obligation.

A contract contains a promise (or promises) to transfer goods or services to a customer. A performance obligation is a promise (or a group of promises) that is distinct. The transaction price is the amount of consideration a Company expects to be entitled to from a customer in exchange for providing the goods or services.

The unit of account for revenue recognition is a performance obligation. A contract may contain one or more performance obligations, including hardware, software, professional services and support and maintenance. Performance obligations are accounted for separately if they are distinct. A good or service is distinct if the customer can benefit from the good or service either on its own or together with other resources that are readily available to the customer, and the good or service is distinct in the context of the contract. Otherwise performance obligations will be combined with other promised goods or services until the Company identifies a bundle of goods or services that is distinct.

The transaction price is allocated to all the separate performance obligations in an arrangement. It reflects the amount of consideration to which the Company expects to be entitled to in exchange for transferring goods or services, which may include an estimate of variable consideration to the extent that it is probable of not being subject to significant reversals in the future based on the Company's experience with similar arrangements. The transaction price also reflects the impact of the time value of money if there is a significant financing component present in an arrangement. The transaction price excludes amounts collected on behalf of third parties, such as sales taxes.

Revenue is recognized when the Company satisfies each performance obligation by transferring control of the promised goods or services to the customer. Goods or services can transfer at a point in time or over time depending on the nature of the arrangement.

Inventories

Inventories are stated at the lower of cost (determined on first-in, first-out basis) or net realizable value. The cost of inventories is comprised of material and manufacturing labor and overheads. The Company establishes provisions for excess and obsolete inventories to reduce such inventories to their estimated net realizable value after evaluation of historical sales, future demand and market conditions, expected product life cycles and current inventory levels. Such provisions are charged to cost of revenue in the Company's Consolidated Statements of Operations.

Property and Equipment

Property and equipment are recorded at cost. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. Estimated useful lives are generally five years for furniture and fixtures, three years for software and four years for machinery and equipment. Depreciation for leasehold improvements are computed using the shorter of estimated useful lives or the terms of the related leases.

Long-Lived Assets including Purchased Intangible Assets

The Company reviews property and equipment, intangible assets and other long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset (or asset group) may not be recoverable. Recoverability is measured by comparing the carrying amount to the future undiscounted cash flows that the asset is expected to generate. If the asset is not recoverable, its carrying amount would be adjusted down to its fair value. For the years ended December 31, 2022, 2021 and 2020, there were no impairment charges for long-lived assets.

Goodwill

Goodwill is assigned to one or more reporting segments on the date of acquisition. We review our goodwill for impairment annually during our fourth quarter of each fiscal year and between annual tests if an event occurs or circumstances change that would more likely than not reduce the fair value of any one of our reporting units below its respective carrying amount. In performing our goodwill impairment test, we first perform a qualitative assessment, which requires that we consider events or circumstances including macroeconomic conditions, industry and market considerations, cost factors, overall financial performance, changes in management or key personnel, changes in strategy, changes in customers, changes in the composition or carrying amount of a reporting segment's net assets and changes in our stock price. If, after assessing the totality of events or circumstances, we determine that it is more likely than not that the fair values of our reporting segments are greater than the carrying amounts, then the quantitative goodwill impairment test is not performed.

If the qualitative assessment indicates that the quantitative analysis should be performed, we then evaluate goodwill for impairment by comparing the fair value of each of our reporting segments to its carrying value, including the associated goodwill. To determine the fair values, we use the equal weighting of the market approach based on comparable publicly traded companies in similar lines of businesses and the income approach based on estimated discounted future cash flows. Our cash flow assumptions consider historical and forecasted revenue, operating costs and other relevant factors.

We completed our annual goodwill impairment test in the fourth quarter of fiscal 2022. We determined, after performing a qualitative review of each reporting segment, that it is more likely than not that the fair value of each of our reporting segments substantially exceeds the respective carrying amounts. Accordingly, there was no indication of impairment and the quantitative goodwill impairment test was not performed. For the years ended December 31, 2022, 2021 and 2020, there were no impairment charges for goodwill.

Leases

The Company determines if an arrangement is a lease at inception. Operating lease liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. The Company's lease contracts do not provide an implicit borrowing rate; hence the Company determined the incremental borrowing rate based on information available at lease commencement to determine the present value of lease liability. ROU assets related to our operating lease liabilities are measured at lease inception based on the initial measurement of the lease liability, plus any prepaid lease payments and less any lease incentives. As of December 31, 2022, the Company has operating leases primarily consisting of facilities with remaining lease terms of 1 year to 10 years, some of which included the option to extend the term. Optional periods to extend the lease, including by not exercising a termination option, are included in the lease term when it is reasonably certain that the option will be exercised. The Company amortizes ROU assets as operating lease expense generally on a straight-line basis over the lease term. Operating leases are included in "Operating lease right-of-use assets", "Operating lease liabilities, current", and "operating lease liabilities, non-current" in the Consolidated Balance Sheets.

Foreign Currency

The functional currency of the Company's Israeli and Swiss subsidiaries is the U.S. dollar. All other foreign subsidiaries use the respective local currency as the functional currency. When the local currency is the functional currency, gains and losses from translation of these foreign currency financial statements into U.S. dollars are recorded as a separate component of other comprehensive income (loss) in stockholders' equity.

The Company's foreign currency exposure is also related to its net position of monetary assets and monetary liabilities held by its foreign subsidiaries in their nonfunctional currencies. These monetary assets and liabilities are being remeasured into the subsidiaries' respective functional currencies using exchange rates as of the balance sheet date. Such remeasurement gains and losses are included in "Other income (expense), net" in the Company's Consolidated Statements of Operations. During the years ended December 31, 2022, and 2020, the Company recorded remeasurement loss of approximately \$0.3 million and \$1.0 million, respectively. During the year ended December 31, 2021, the Company recorded remeasurement gain of \$0.6 million.

Derivative Instruments

The Company enters into derivative instruments, primarily foreign currency forward contracts, to minimize the short-term impact of foreign currency exchange rate fluctuations on certain foreign currency denominated assets and liabilities as well as certain foreign currencies denominated expenses. The Company does not enter into derivative instruments for trading purposes and these derivatives generally have maturities within three months.

The derivative instruments are recorded at fair value in prepaid expenses and other current assets or accrued and other current liabilities in the Company's Consolidated Balance Sheets. The Company enters into derivative instruments to hedge existing foreign currency denominated assets or liabilities, the gains or losses on these hedges are recorded immediately in earnings to offset the changes in the fair value of the assets or liabilities being hedged.

Research and Development

Research and development (“R&D”) costs are expensed as incurred and consists primarily of employee salaries and related expenses, contractors and outside consultants, supplies and materials, equipment depreciation and facilities costs, all associated with the design and development of new products and enhancements of existing products.

The Company’s French subsidiary participates in the French Crédit d’Impôt Recherche (“CIR”) program which allows companies to monetize eligible research expenses. The R&D credits receivable from the French government for spending on innovative R&D under the CIR program is recorded as an offset to R&D expenses. In the years ended December 31, 2022, 2021 and 2020, the Company had R&D credits of \$5.4 million, \$5.7 million and \$4.5 million, respectively.

Restructuring and Related Charges

The Company’s restructuring charges consist primarily of employee severance, one-time termination benefits related to the reduction of its workforce, and other costs. Liabilities for costs associated with a restructuring activity are recognized when the liability is incurred and are measured at fair value. One-time termination benefits are expensed at the date the entity notifies the employee, unless the employee must provide future service, in which case the benefits are expensed ratably over the future service period. Termination benefits are calculated based on regional benefit practices and local statutory requirements.

Warranty

The Company accrues for estimated warranty costs at the time of revenue recognition and records such accrued liabilities as part of cost of revenue. Management periodically reviews its warranty liability and adjusts the accrued liability based on the terms of warranties provided to customers, historical and anticipated warranty claims experience, and estimates of the timing and cost of warranty claims.

Advertising Expenses

All advertising costs are expensed as incurred and included in “Selling, general and administrative expenses” in the Company’s Consolidated Statements of Operations. Advertising expense was \$0.7 million, \$1.0 million and \$1.1 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Stock-based Compensation

The Company measures and recognizes compensation expense for all stock-based compensation awards made to employees, including stock options, restricted stock units (“RSUs”) and stock purchase rights under the Company’s Employee Stock Purchase Plan (“ESPP”), based upon the grant-date fair value of those awards. The Company recognizes the impact of forfeitures as they occur.

The fair value of the Company’s stock options and stock purchase rights under ESPP is estimated at grant date using the Black-Scholes option pricing model. The fair value of the Company’s RSUs and performance-based RSUs (“PRSUs”) is calculated based on the market value of the Company’s stock at the grant date. The fair value of the Company’s market-based RSUs (“MRSUs”) is estimated using the Monte-Carlo valuation model with market vesting conditions.

The Company recognizes the stock-based compensation for options, RSUs, MRSUs and stock purchase rights under ESPP on straight-line basis over the requisite service period, which is generally the vesting period. The Company recognizes the stock-based compensation for PRSUs based on the probability of achieving performance criteria defined in the PRSU agreements. The Company estimates the number of PRSUs ultimately expected to vest and recognizes expense using the graded vesting attribution method over the requisite service period. Changes in the estimates related to probability of achieving certain performance criteria and number of PRSUs expected to vest could significantly affect the related stock-based compensation expense from one period to the next.

Pension Plan

Under French law, the Company's subsidiary in France is obligated to provide for a defined benefit plan to its employees upon their retirement from the Company. The Company's defined benefit pension plan in France is unfunded.

The Company records its obligations relating to the pension plans based on calculations which include various actuarial assumptions including employees' age and period of service with the company; projected mortality rates, mobility rates and increases in salaries; and a discount rate. The Company reviews its actuarial assumptions on an annual basis as of December 31 (or more frequently if a significant event requiring remeasurement occurs) and modifies the assumptions based on current rates and trends when it is appropriate to do so. The effect of modifications to those assumptions is recorded in other comprehensive income (loss) and amortized to net periodic benefit cost over the expected remaining period of service of the covered employees using the corridor method. The Company believes that the assumptions utilized in recording its obligations under its pension plan are reasonable based on its experience, market conditions and input from its actuaries.

Income Taxes

The Company accounts for income taxes using the asset and liability method of accounting for income taxes. The Company calculates and provides for income taxes in each of the tax jurisdictions in which it operates. The deferred tax assets and liabilities are recognized for future tax consequences attributable to temporary differences between the financial statement carrying values of existing assets and liabilities and their respective tax bases and all operating losses carried forward, if any. Deferred tax assets and liabilities are measured using tax rates expected to apply to taxable income in the years in which the applicable temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates or tax status is recognized in the statements of income in the period in which the change is identified. Deferred tax assets are reduced by a valuation allowance if, based on available evidence, it is more likely than not that some portion or all of the deferred tax assets will not be realized.

The Company is subject to examination of its income tax returns by various tax authorities on a periodic basis. The Company regularly assesses the likelihood of adverse outcomes resulting from such examinations to determine the adequacy of its provision for income taxes. The Company has applied the provisions of the applicable accounting guidance on accounting for uncertainty in income taxes, which requires application of a more-likely-than-not threshold to the recognition and de-recognition of uncertain tax positions. If the recognition threshold is met, the applicable accounting guidance permits the Company to recognize a tax benefit measured at the largest amount of tax benefit that, in the Company's judgment, is more than 50% likely to be realized upon settlement. It further requires that a change in judgment related to the expected ultimate resolution of uncertain tax positions be recognized in earnings in the period of such change.

The Company files annual income tax returns in multiple taxing jurisdictions around the world. A number of years may elapse before an uncertain tax position is audited and finally resolved. While it is often difficult to predict the final outcome or the timing of resolution of any particular uncertain tax position, the Company believes that its reserves for income taxes reflect the most likely outcome. The Company adjusts these reserves and penalties, as well as the related interest, in light of changing facts and circumstances. Changes in the Company's assessment of its uncertain tax positions or settlement of any particular position could materially and adversely impact the Company's income tax rate, operating results, financial position and cash flows.

Recently Adopted Accounting Pronouncements

In August 2020, the Financial Accounting Standards Board ("FASB") issued ASU No. 2020-06, Accounting for Convertible Instruments in an Entity's Own Equity, which simplifies the accounting for convertible instruments and contracts on an entity's own equity. The Company adopted ASU 2020-06 effective on January 1, 2022, using the modified retrospective method. Among other changes, ASU 2020-06 removes from U.S. GAAP the liability and equity separation model for convertible instruments with a cash conversion feature. As a result, the Company no longer separately presents in equity an embedded conversion feature for such debt. Similarly, the embedded conversion feature is no longer amortized into consolidated statement of operations as interest expense over the life of the instrument. The cumulative effect of the ASU adoption was as follows:

(in thousands)	Balance at December 31, 2021	Adjustments from Adoption of ASU 2020-06	Balance at January 1, 2022
Liabilities			
Convertible debt, current	\$ 36,824	\$ 626	\$ 37,450
Convertible debt, non-current	98,941	14,167	113,108
Mezzanine equity			
Convertible debt	883	(883)	—
Equity			
Additional paid-capital	2,387,039	(32,249)	2,354,790
Accumulated deficit	(2,087,957)	18,339	(2,069,618)

The impact of ASU adoption on the consolidated statement of operations for the fiscal year ended December 31, 2022 was to decrease net interest expense by \$5.6 million. This had the effect of increasing the basic and diluted net income per share for the fiscal year ended December 31, 2022 by approximately \$0.05. The required use of if-converted method to calculate the impact of convertible notes on diluted earnings per share does not have a material impact. The Company was contractually required to settle the principal amount of the 2022 Notes, and is contractually required to settle the principal amount of the 2024 Notes, in cash, and the 2022 Notes were settled in December 2022 upon maturity. Accordingly, the dilutive effect of the Company's 2022 Notes was, and the diluted effect of the 2024 Notes will be, limited to the conversion premium. The adoption of this ASU does not have any impact on the consolidated statement of cash flows.

From time to time, new accounting pronouncements are issued by the FASB, or other standards setting bodies, that are adopted by the Company as of the specified effective date. Unless otherwise discussed, the Company believes the impact of recently issued standards that are not yet effective will not have a material impact on its consolidated financial position, results of operations and cash flows upon adoption.

NOTE 3: INVESTMENTS IN EQUITY SECURITIES

In May 2022, the Company sold its investment in Encoding.com, Inc. for total consideration of up to approximately \$10.7 million. The Company received \$7.8 million in May 2022 and recognized a gain of \$4.2 million. The balance of the consideration of up to approximately \$2.9 million will be payable to the Company within 18 months from the date of sale, subject to certain conditions and indemnity obligations, and will be recorded upon receipt by the Company.

NOTE 4: REVENUE

Hardware and Software. Revenue from the sale of hardware and software products is recognized when the control is transferred. For most of the Company's product sales (including sales to distributors and system integrators), the control is transferred at the time the product is shipped or delivery has occurred because the customer has significant risks and rewards of ownership of the asset and the Company has a present right to payment at that time. The Company's agreements with the distributors and system integrators have terms which are generally consistent with the standard terms and conditions for the sale of the Company's equipment to end users, and do not provide for product rotation or pricing allowances, as are typically found in agreements with stocking distributors. The Company offers return rights which are specifically identified and accrued for as sales returns at the end of the period.

Shipping and handling costs are accounted for as a fulfillment cost and are recorded in "Cost of revenue" in the Company's Consolidated Statements of Operations. Sales tax and other amounts collected on behalf of third parties are excluded from the transaction price.

Arrangements with Multiple Performance Obligations. The Company has revenue arrangements that include multiple performance obligations. The Company allocates transaction price to all separate performance obligations based on their relative standalone selling prices ("SSP"). The Company may exercise judgment when determining whether products and services are considered distinct performance obligations that should be accounted for separately versus together. To determine the standalone selling price, the Company first looks to establish the standalone selling price through an observable price when the good or service is sold separately in similar circumstances. If the standalone selling price cannot be established through an observable standalone price, we make an estimate which considers multiple factors including, but not limited to, major product groupings, geographies, gross margin objectives and pricing practices. Pricing practices taken into consideration include contractually stated prices, discounts offered and applicable price lists.

If the Company has not yet established a selling price because the good or service has not previously been sold on a standalone basis, SSP for such good and service in a contract with multiple performance obligations is determined by applying a residual approach whereby all other performance obligations within a contract are first allocated a portion of the transaction price based upon their respective SSP, using observable prices, with any residual amount of the transaction price allocated to the good or service for which the price has not yet been established.

Solution Sales. Solution sales for the design, manufacture, test, integration and installation of products, including equipment acquired from third parties to be integrated with Harmonic's products, that are customized to meet the customer's specifications are accounted for based on the percentage-of-completion basis, using the input method. Some of our arrangements may include acceptance provisions that require testing of the solution against specific performance criteria. The Company performs a detailed evaluation to determine whether the arrangement involves performance criteria based on our standard performance criteria. The Company has a long-standing history of entering into contractual arrangements to deliver the solution sales based on standard performance criteria. For this type of arrangement, we consider the customer acceptance clause not substantive and recognize product revenue when the customer takes possession of the product and recognize service on a percentage-of-completion basis using the input method. However, if the solution results in significant production, modification or customization, we consider the arrangement as a single performance obligation and recognize the revenue at a point in time, or as a percentage of completion, depending on the complexity of the solution and nature of acceptance.

The use of the input method requires the Company to make reasonably dependable estimates. We use the input method based on labor hours, where revenue is calculated based on the percentage of total hours incurred in relation to total estimated hours at completion of the contract. The input method is reasonable because the hours best reflect the Company's efforts toward satisfying the performance obligation over time. As circumstances change over time, the Company updates its measure of progress to reflect any changes in the outcome of the performance obligation. Such changes to an entity's measure of progress are accounted for as a change in accounting estimates.

Professional services. Revenue from professional services is recognized over time as the services are performed or on the percentage-of-completion basis using the input method.

Support and maintenance. Support and maintenance services are satisfied ratably over time as the customer simultaneously receives and consumes the benefits of the services.

Contract Balances. Deferred revenue represents the Company's obligation to transfer goods or services to a customer for which the Company has received consideration (or an amount of consideration is due) from the customer. The Company's payment terms vary by the type and location of its customer and the products or services offered. The term between invoicing and when payment is due is not significant. For certain products or services and customer types, the Company requires payment before the products or services are delivered to the customer.

Revenue recognized during the year ended December 31, 2022 that was included in the deferred revenue balance at January 1, 2022 was \$47.9 million. Revenue recognized during the year ended December 31, 2021 that was included within the deferred revenue balance at January 1, 2021 was \$52.2 million.

Contract assets exist when the Company has satisfied a performance obligation but does not have an unconditional right to consideration (e.g., because the entity first must satisfy another performance obligation in the contract before it is entitled to invoice the customer).

Contract assets and deferred revenue consisted of the following:

(in thousands)	As of December 31,	
	2022	2021
Contract assets	\$ 5,580	\$ 8,101
Deferred revenue	\$ 80,471	\$ 78,167

Contract assets and the non-current portion of Deferred revenue are reported as components of "Prepaid expenses and other current assets" and "Other non-current liabilities", respectively, on the Consolidated Balance Sheets.

Remaining performance obligations represent contracted revenues that had not yet been recognized and future revenue recognition is expected. The aggregate balance of the Company's remaining performance obligations as of December 31, 2022, was \$473.4 million, of which approximately 80% is expected to be recognized as revenue over the next 12 months and the remainder thereafter.

Contract costs. The incremental costs of obtaining a contract are capitalized if the costs are expected to be recovered. Costs that are recognized as assets are amortized on a straight-line basis over the period during which the related goods or services transfer to the customer. Costs incurred to fulfill a contract are capitalized if they are not covered by other relevant guidance, relate directly to a contract, will be used to satisfy future performance obligations, and are expected to be recovered.

The balances of net capitalized contract costs included in the Company's Consolidated Balance Sheets were as follows:

<i>(in thousands)</i> Balance Sheet Location	As of December 31,	
	2022	2021
Prepaid expenses and other current assets	\$ 1,766	\$ 1,907
Other non-current assets	1,337	1,636
Total net capitalized contract costs	\$ 3,103	\$ 3,543

The amortization of the capitalized contract costs for the years ended December 31, 2022, 2021 and 2020 was \$2.2 million, \$2.3 million and \$1.6 million.

Refer to Note 17, "Segment Information, Geographic Information and Customer Concentration" for disaggregated revenue information.

NOTE 5. LEASES

During the fiscal year ended December 31, 2022, the Company entered into new or modified lease agreements which were assessed under Topic 842 to be operating leases. The new or modified lease agreements resulted in the balance sheet recognition of \$0.9 million in "Operating lease right-of use assets," \$0.7 million in "Operating lease liabilities, long-term," and \$0.2 million in "Operating lease liabilities, current."

The components of lease expense are as follows:

<i>(in thousands)</i>	Year ended December 31,	
	2022	2021
Operating lease cost	\$ 7,636	\$ 7,550
Variable lease cost	1,780	1,986
Total lease cost	\$ 9,416	\$ 9,536

Supplemental cash flow information related to leases are as follows:

<i>(in thousands)</i>	Year ended December 31,	
	2022	2021
Cash paid for amounts included in the measurement of operating lease liabilities	\$ 7,528	\$ 7,644
ROU assets obtained in exchange for operating lease obligations	\$ 862	\$ 8,837

Other information related to leases are as follows:

	Year ended December 31,	
	2022	2021
Operating leases		
Weighted-average remaining lease term (years)	6.2	6.8
Weighted-average discount rate	6.3 %	6.3 %

Future minimum lease payments under non-cancelable operating leases as of December 31, 2022 are as follows (in thousands):

Years ending December 31,		
2023	\$	7,106
2024		7,066
2025		5,884
2026		4,847
2027		3,770
Thereafter		8,877
Total future minimum lease payments	\$	37,550
Less: imputed interest		(6,667)
Total lease liability balance	\$	30,883

NOTE 6: DERIVATIVES AND HEDGING ACTIVITIES

Derivatives Not Designated as Hedging Instruments (Balance Sheet Hedges)

The Company's balance sheet hedges consist of foreign currency forward contracts, which mature generally within three months. These forward contracts are carried at fair value and they are used to minimize the short-term impact of foreign currency exchange rate fluctuation on cash and certain trade and intercompany receivables and payables. Changes in the fair value of these foreign currency forward contracts are recognized in "Other expense, net" in the Consolidated Statements of Operations and are largely offset by the changes in the fair value of the assets or liabilities being hedged. Foreign currency forward contracts' gains recognized during the years ended December 31, 2022, 2021 and 2020, were \$0.3 million, \$0.7 million and \$2.2 million, respectively.

The U.S. dollar equivalents of all outstanding notional amounts of foreign currency forward contracts were as follows:

(in thousands)	As of December 31,	
	2022	2021
Purchase	\$ 7,971	\$ 2,926
Sell	\$ —	\$ 5,175

While the Company's arrangements with its counterparties allow for net settlement, which is designed to reduce credit risk by permitting net settlement with the same counterparty, the Company recognizes all derivative instruments in the Consolidated Balance Sheets on a gross basis. As of December 31, 2022 and 2021, gross fair values of derivative assets and liabilities, recorded as components of "Prepaid expenses and other current assets" and "Other current liabilities", respectively, in the Consolidated Balance Sheets, were immaterial.

In connection with foreign currency derivatives entered in Israel, the Company's subsidiaries in Israel are required to maintain a compensating balance with their bank at the end of each month. The compensating balance arrangements do not legally restrict the use of cash. As of December 31, 2022 and 2021, the total compensating balance maintained was \$1.0 million.

NOTE 7: FAIR VALUE MEASUREMENTS

The applicable accounting guidance establishes a framework for measuring fair value and requires disclosure about the fair value measurements of assets and liabilities. This guidance defines fair value as the exchange price that would be received for an asset or paid to transfer a liability, in the principal or most advantageous market for the asset or liability, 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. This guidance requires the Company to classify and disclose assets and liabilities measured at fair value on a recurring basis, as well as fair value measurements of assets and liabilities measured on a nonrecurring basis in periods subsequent to initial measurement, in a three-tier fair value hierarchy as follows:

- Level 1 - Observable inputs that reflect quoted prices for identical assets or liabilities in active markets.
- Level 2 - Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3 - Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The carrying value of the Company's financial instruments, including cash equivalents, restricted cash, accounts receivable, accounts payable and accrued liabilities, approximate fair value due to their short maturities.

The Company's financial instruments not measured at fair value on a recurring basis were as follows:

	December 31, 2022				December 31, 2021			
	Carrying	Fair Value			Carrying	Fair Value		
(in thousands)	Value	Level 1	Level 2	Level 3	Value	Level 1	Level 2	Level 3
2022 Notes	\$ —	\$ —	\$ —	\$ —	\$ 36,824	\$ —	\$ 78,619	\$ —
2024 Notes	\$ 113,981	\$ —	\$ 181,139	\$ —	\$ 98,941	\$ —	\$ 173,419	\$ —
French and other loans	\$ 11,161	\$ —	\$ 11,161	\$ —	\$ 17,981	\$ —	\$ 17,981	\$ —

The fair value of the Company's Notes is influenced by interest rates, the Company's stock price and stock market volatility. The difference between the carrying value and the fair value is primarily due to the spread between the conversion price and the market value of the shares underlying the conversion as of each respective balance sheet date. The Company's French and other loans are classified within Level 2 because these borrowings are not actively traded and the majority of them have a variable interest rate structure based upon market rates currently available to the Company for debt with similar terms and maturities; therefore, the carrying value of these debts approximate its fair value. Refer to Note 12, "Convertible Notes and Other Debts," for additional information.

During the years ended December 31, 2022, 2021, and 2020, there were no nonrecurring fair value measurements of assets and liabilities subsequent to initial recognition.

NOTE 8: GOODWILL

The changes in the Company's carrying amount of goodwill are as follows:

<i>(in thousands)</i>	Video	Broadband	Total
Balance as of December 31, 2020	\$ 182,855	\$ 60,819	\$ 243,674
Foreign currency translation adjustment	(3,457)	(4)	(3,461)
Balance as of December 31, 2021	\$ 179,398	\$ 60,815	\$ 240,213
Foreign currency translation adjustment	(2,409)	(65)	(2,474)
Balance as of December 31, 2022	\$ 176,989	\$ 60,750	\$ 237,739

NOTE 9: ACCOUNTS RECEIVABLE

Accounts receivable, net of allowances, consisted of the following:

<i>(in thousands)</i>	As of December 31,	
	2022	2021
Accounts receivable	\$ 110,576	\$ 91,382
Less: allowance for expected credit losses and sales returns	(2,149)	(2,853)
Total	\$ 108,427	\$ 88,529

Trade accounts receivable are recorded at invoiced amounts and do not bear interest. The Company generally does not require collateral and performs ongoing credit evaluations of its customers and provides for expected losses. The Company maintains an allowance for expected credit losses based upon the expected collectability of its accounts receivable. The expectation of collectability is based on the Company's review of credit profiles of customers, contractual terms and conditions, current economic trends and historical payment experience. The Company offers return rights which are specifically identified and accrued for as sales returns at the end of the period.

The following table is a summary of activities in allowances for expected credit losses and sales returns:

<i>(in thousands)</i>	Balance at Beginning of Period	Charges to Revenue	Charges (Credits) to Expense	Deductions from Reserves	Balance at End of Period
Year ended December 31,					
2022	\$ 2,853	\$ 1,118	\$ 836	\$ (2,658)	\$ 2,149
2021	\$ 2,068	\$ 2,609	\$ 1,533	\$ (3,357)	\$ 2,853
2020	\$ 3,013	\$ 1,367	\$ 299	\$ (2,611)	\$ 2,068

NOTE 10: CERTAIN BALANCE SHEET COMPONENTS

Inventories:

<i>(in thousands)</i>	December 31,	
	2022	2021
Finished goods	\$ 65,308	\$ 37,545
Raw materials	46,081	22,245
Work-in-process	3,251	3,993
Service-related spares	6,309	7,412
Total	\$ 120,949	\$ 71,195

Prepaid expenses and other current assets:

(in thousands)	December 31,	
	2022	2021
Prepaid expenses	\$ 5,558	\$ 8,074
Contract assets ⁽¹⁾	5,583	8,101
Other current assets	15,196	13,797
Total	<u>\$ 26,337</u>	<u>\$ 29,972</u>

(1) Contract assets reflect the satisfied performance obligations for which the Company does not yet have an unconditional right to consideration.

Property and equipment, net:

(in thousands)	December 31,	
	2022	2021
Machinery and equipment	\$ 75,589	\$ 78,461
Capitalized software	30,588	38,306
Leasehold improvements	39,199	40,658
Furniture and fixtures	2,739	2,820
Construction-in-progress	2,691	1,892
Property and equipment, gross	150,806	162,137
Less: accumulated depreciation and amortization	(110,992)	(119,416)
Total	<u>\$ 39,814</u>	<u>\$ 42,721</u>

Other current liabilities:

(in thousands)	December 31,	
	2022	2021
Accrued employee compensation and related expenses	\$ 29,675	\$ 26,820
Other	37,049	26,824
Total	<u>\$ 66,724</u>	<u>\$ 53,644</u>

NOTE 11: RESTRUCTURING AND RELATED CHARGES

The Company has implemented several restructuring plans in the past few years. The goal of these plans was to bring operational expenses to appropriate levels relative to the Company's net revenue, while simultaneously implementing extensive company-wide expense control programs. The restructuring plans have primarily been comprised of severance payments and termination benefits related to headcount reductions. The Company accounts for its restructuring plans under the authoritative guidance for exit or disposal activities.

The following table summarizes the activities related to the Company's restructuring plans accrual, reported as components of "Other current liabilities" on the Consolidated Balance Sheets:

(in thousands)	Severance and Benefits
Balance at December 31, 2021	\$ 2,092
Charges for current period	3,739
Cash payments	(4,438)
Other	(349)
Balance at December 31, 2022	<u>\$ 1,044</u>

For the year ended December 31, 2022, \$0.5 million and \$3.3 million of restructuring and related charges are included in "Cost of revenue" and "Operating expenses - Restructuring and related charges", respectively, in the Consolidated Statements of Operations.

NOTE 12: CONVERTIBLE NOTES AND OTHER DEBTS

4.375% Convertible Senior Notes due 2022 (the “2022 Notes”)

In June 2020, the Company issued the 2022 Notes with an aggregate principal amount of \$37.7 million in a non-cash exchange for its 2020 Notes with an equal principal amount pursuant to an indenture, dated June 2, 2020 (the “2022 Notes Indenture”), by and between the Company and U.S. Bank Trust Company, National Association (as successor in interest to U.S. Bank National Association), as trustee. The 2022 Notes bore interest at a rate of 4.375% per year, payable in cash on June 1 and December 1 of each year. The 2022 Notes matured on December 1, 2022.

The 2022 Notes were initially convertible into cash, shares of the Company’s common stock, or a combination thereof, at the Company’s election, at an initial conversion rate of 173.9978 shares of the Company’s common stock per \$1,000 principal amount of the 2022 Notes (which is equivalent to an initial conversion price of approximately \$5.75 per share). Pursuant to the supplemental indenture entered into by the Company and the trustee during the fourth quarter of fiscal 2021, the Company made an irrevocable election to settle the principal amounts of the 2022 Notes solely with cash and may pay or deliver, as the case may be, any conversion value greater than the principal amount in cash, shares of the Company’s common stock or a combination thereof, at the Company’s election. The conversion rate, and thus the effective conversion price, was adjustable under certain circumstances, including in connection with conversions made following certain fundamental changes and under other circumstances as set forth in the 2022 Notes Indenture.

As discussed in the Note 2. “Recent Accounting Pronouncements”, effective January 1, 2022, the Company adopted ASU 2020-06 using the modified retrospective method and, as a result, accounted for the Convertible debt as a single liability measured at amortized cost.

On or after September 1, 2022, until the close of business on the scheduled trading day immediately preceding the maturity date, holders of the 2022 Notes were able to convert all or a portion of their 2022 Notes regardless of any conditions. Prior to maturity date, the entire principal balance of \$37.7 million was converted by holders of the 2022 Notes. In accordance with provisions of the 2022 Notes Indenture and the aforementioned supplemental indenture, conversions were settled in a combination of cash and the Company’s common Stock. The principal amount of \$37.7 million that matured on December 1, 2022 was paid in cash. The conversion value greater than the principal amount was delivered in 3.9 million shares of the Company’s common stock.

The following table presents interest expense recognized for the 2022 Notes:

(in thousands)

	Year ended December 31,		
	2022	2021	2020
Contractual interest expense	\$ 1,511	\$ 1,648	\$ 953
Amortization of debt discount	—	685	373
Amortization of debt issuance costs	257	214	117
Total interest expense recognized	<u>\$ 1,768</u>	<u>\$ 2,547</u>	<u>\$ 1,443</u>

2.00% Convertible Senior Notes due 2024 (the “2024 Notes”)

In September 2019, the Company issued \$115.5 million of the 2024 Notes pursuant to an indenture (the “2024 Notes Indenture”), dated September 13, 2019, by and between the Company and U.S. Bank Trust Company, National Association (as successor in interest to U.S. Bank National Association), as trustee. The 2024 Notes bear interest at a rate of 2.00% per year, payable semi-annually on March 1 and September 1 of each year, beginning March 1, 2020. The 2024 Notes will mature on September 1, 2024, unless earlier repurchased by the Company, redeemed by the Company or converted pursuant to their terms.

The 2024 Notes were initially convertible into cash, shares of the Company’s common stock, or a combination thereof, at the Company’s election, at an initial conversion rate of 115.5001 shares of the Company’s common stock per \$1,000 principal amount of the 2024 Notes (which is equivalent to an initial conversion price of approximately \$8.66 per share). Pursuant to the supplemental indenture entered into by the Company and the trustee during the fourth quarter of fiscal 2021, the Company made an irrevocable election to settle the principal amounts of the 2024 Notes solely with cash and may pay or deliver, as the case may be, any conversion value greater than the principal amount in cash, shares of the Company’s common stock or a combination thereof, at the Company’s election. The conversion rate, and thus the effective conversion price, may be adjusted under certain circumstances, including in connection with conversions made following certain fundamental changes or a notice of redemption and under other circumstances, in each case, as set forth in the 2024 Notes Indenture.

The 2024 Notes will be convertible at certain times and upon the occurrence of certain events in the future, in each case, specified in the 2024 Notes Indenture. Further, on or after June 1, 2024, until the close of business on the scheduled trading day immediately preceding the maturity date, holders of the 2024 Notes may convert all or a portion of their 2024 Notes regardless of these conditions.

In accordance with the accounting guidance on embedded conversion features, the conversion feature associated with the 2024 Notes was valued at \$24.9 million and bifurcated from the host debt instrument and recorded in “Additional paid-in capital.” The resulting debt discount on the 2024 Notes was being amortized, prior to adoption of ASU 2020-06, to interest expense at the effective interest rate over the contractual term of the 2024 Notes.

As discussed in the Note 2. “Recent Accounting Pronouncements”, effective January 1, 2022, the Company adopted ASU 2020-06 using the modified retrospective method and, as a result, accounted for the Convertible debt as a single liability measured at amortized cost.

The 2024 Notes became convertible as of December 31, 2022, as the last reported sale price of the Company’s common stock for at least 20 trading days during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding fiscal quarter was greater than or equal to 130% of the conversion price of the 2024 Notes on each applicable trading day. All \$114.0 million of the net carrying amount of the 2024 Notes outstanding as of December 31, 2022 was classified as a current liability as of that date.

The following table presents the components of the 2024 Notes:

(in thousands, except for years and percentages)	As of December 31,	
	2022	2021
Liability:		
Principal amount	\$ 115,500	\$ 115,500
Less: Debt discount, net of amortization	—	(14,576)
Less: Debt issuance costs, net of amortization	(1,519)	(1,983)
Carrying amount	<u>\$ 113,981</u>	<u>\$ 98,941</u>
Remaining amortization period (years)	n/a	2.7
Effective interest rate on liability component	n/a	7.95 %

The following table presents interest expense recognized for the 2024 Notes:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Contractual interest expense	\$ 2,312	\$ 2,312	\$ 2,310
Amortization of debt discount	—	4,718	4,358
Amortization of debt issuance costs	874	641	595
Total interest expense recognized	<u>\$ 3,186</u>	<u>\$ 7,671</u>	<u>\$ 7,263</u>

Other Debts

The Company has a variety of debt and credit facilities primarily in France to satisfy the financing requirements of the operations of its French subsidiary. These arrangements are summarized in the table below:

(in thousands)	December 31,	
	2022	2021
Financing from French government agencies related to various government incentive programs ⁽¹⁾	\$ 10,580	\$ 12,259
Relief loans ⁽²⁾	5,337	5,651
Term loans	—	71
Total debt obligations	15,917	17,981
Less: current portion	(4,756)	(4,992)
Long-term portion	<u>\$ 11,161</u>	<u>\$ 12,989</u>

(1) These loans bear variable interest rate at EURIBOR 1 month plus 1.9% and mature between 2023 through 2025.

(2) Refer to the below section “Relief Loans” for the description of these loans.

The table below presents the future minimum repayments of other debts as of December 31, 2022 (in thousands):

Year ending December 31,

2023	\$	4,756
2024		4,756
2025		5,065
2026		1,340
Total	\$	15,917

Relief Loans

In June 2020, Harmonic France was granted a loan from Société Générale S.A. (the “SG Loan”) in the aggregate amount of 5 million Euros, pursuant to a state guarantee program introduced in March 2020 to provide relief to companies from the financial consequences of the COVID-19 pandemic. The SG Loan was initially maturing in June 2021. During 2021, SG Loan maturity was extended to June 2026. The SG loan bears an effective interest rate of 0.51% per annum payable annually and may be repaid at any time prior to maturity with no repayment penalties. There are no restrictions on the use of funds from the SG Loan. The purpose of the funds from the SG Loan is to allow the preservation of activity and employment in France. As of December 31, 2022, there was \$5.3 million outstanding under the loan, of which \$1.3 million was recorded in “Other debts, current” and \$4.0 million was recorded in “Other debts, non-current” in the Consolidated Balance Sheets.

Line of Credit

On December 19, 2019, the Company entered into a Credit Agreement with JPMorgan Chase Bank, N.A. as lender, and Harmonic International GmbH, as co-borrower (the “Credit Agreement”). The Credit Agreement provides for a secured revolving loan facility in an aggregate principal amount of up to \$25.0 million, based on a borrowing base of eligible accounts receivable and inventory. The Company may use availability under the revolving loan facility for the issuance of letters of credit. The proceeds of the revolving loans may be used for general corporate purposes.

On October 28, 2022, the Company amended the Credit Agreement to (i) extend the Credit Agreement maturity date to October 28, 2025 or subject to certain exceptions, the date that is 90 days prior to the maturity date of the 2024 Notes (to the extent the 2024 Notes remain outstanding as of such date) and (ii) amend the interest rate provisions to LIBOR with SOFR as the interest rate benchmark for the revolving loans. As amended, the revolving loans bear interest, at the Company’s election, at a floating rate per annum equal to either (1) 2.00% plus the greater of (i) 2.50% and (ii) the prime rate as reported in the Wall Street Journal from time to time or (2) 3.00% plus adjusted term SOFR for an interest period of one, three or six months. Except in cases of default, prepayment or conversion, Interest on the revolving loans is payable monthly in arrears, in the case of prime rate loans, and at the end of the applicable interest period, in the case of SOFR loans.

The Credit Agreement contains customary affirmative and negative covenants, including covenants limiting the ability of the Company, among other things, incur debt, grant liens, undergo certain fundamental changes, make investments, make certain restricted payments, dispose of assets, enter into transactions with affiliates, and enter into burdensome agreements, in each case, subject to limitations and exceptions set forth in the Credit Agreement. The Company is also required to maintain compliance with an adjusted quick ratio, a minimum EBITDA covenant (tested quarterly) and a minimum liquidity covenant, in each case, determined in accordance with the terms of the Credit Agreement. As of December 31, 2022, the Company was in compliance with the covenants under the Credit Agreement.

There were no borrowings under the Credit Agreement outstanding as of December 31, 2022.

NOTE 13: EMPLOYEE BENEFIT PLANS

Equity Award Plans

1995 Stock Plan

The 1995 Stock Plan provides for the grant of incentive stock options, non-statutory stock options and restricted stock units (“RSUs”). Incentive stock options may be granted only to employees. All other awards may be granted to employees and non-employees. Under the terms of the 1995 Stock Plan, no incentive stock option or non-statutory stock option may be granted in the ordinary course of business with a per share exercise price that is less than 100% of the fair value of the Company’s common stock on the date of grant. RSUs have no exercise price. Both options and RSUs vest over a period of time as determined by the Company’s Board of Directors (the “Board”), generally two to four years, and options expire seven years from the date of grant. Some of the RSUs granted by the Company have performance-based vesting terms, where vesting is dependent on achievement of certain financial and non-financial operating goals of the Company (performance-based RSUs, or “PRSUs”), or where vesting is dependent on performance of the Company’s total shareholder return (“TSR”) relative to the TSR of the NASDAQ Telecommunication Index (market-based RSUs, or “MRSUs”). The Company’s stockholders approved an amendment to the 1995 Stock Plan at the 2022 annual meeting of stockholders (the “2022 Annual Meeting”) to increase the number of shares of common stock reserved for issuance thereunder by 7,000,000 shares. As of December 31, 2022, an aggregate of 10,984,093 shares of common stock were reserved for issuance under the 1995 Stock Plan, of which 7,667,045 shares remained available for future grants.

2002 Director Plan

The 2002 Director Plan provides for the grant of non-statutory stock options and RSUs to non-employee directors of the Company. Under the terms of the 2002 Director Plan, no non-statutory stock option may be granted with a per share exercise price that is less than 100% of the fair value of the Company’s common stock on the date of grant. RSUs have no exercise price. Both options and RSUs vest over a period of time as determined by the Board, generally one year for RSUs and three years for options, and options expire seven years from the date of grant. As of December 31, 2022, an aggregate of 706,377 shares of common stock were reserved for issuance under the 2002 Director Plan, of which 524,199 shares remained available for future grants.

Employee Stock Purchase Plan

The 2002 Employee Stock Purchase Plan (“ESPP”) provides for the issuance of share purchase rights to employees of the Company. The ESPP is intended to qualify as an “employee stock purchase plan” under Section 423 of the Internal Revenue Code. The ESPP enables employees to purchase shares at 85% of the fair market value of the Common Stock at the beginning or end of the offering period, whichever is lower. Offering periods generally begin on the first trading day on or after January 1 and July 1 of each year. Employees may participate through payroll deductions of 1% to 10% of their earnings. In the event that there are insufficient shares in the plan to fully fund the issuance, the available shares will be allocated across all participants based on their contributions relative to the total contributions received for the offering period. The Company’s stockholders approved an amendment to the ESPP Plan at the 2022 Annual Meeting to increase the number of shares of common stock reserved for issuance thereunder by 1,000,000 shares. As of December 31, 2022, 1,366,962 shares were reserved for future purchases by eligible employees. Under the ESPP, 817,243, 1,024,244 and 1,036,543 shares were issued during fiscal 2022, 2021 and 2020, respectively, representing \$5.9 million, \$5.1 million and \$4.5 million in contributions.

Stock Options

(in thousands, except per share amounts)

	Number of Shares	Weighted-Average Exercise Price (per share)
Balance at December 31, 2021	388	\$ 3.15
Exercised	(388)	3.15
Canceled	—	—
Balance at December 31, 2022	—	\$ —

All stock options are fully vested and exercised as of December 31, 2022. Aggregate intrinsic value represents the difference between the exercise price of the stock options and the fair value of the Company’s common stock as of December 31, 2022. The intrinsic value of stock options exercised during the years ended December 31, 2022, 2021 and 2020 was \$3.9 million, \$2.1 million and \$0.2 million, respectively.

No stock options were granted nor vested during the years ended December 31, 2022, 2021 and 2020.

The Company realized income tax benefit of \$0.3 million from stock option exercises for the year ended December 31, 2022. The Company realized no income tax benefit from stock option exercises for the years ended December 31, 2021 and 2020 due to recurring tax losses and valuation allowances.

Restricted Stock Units

(in thousands, except per share amounts)	Year ended December 31,	
	Number of Shares	Weighted Average Grant-Date Fair Value Per Share
Balance at December 31, 2021	3,878	\$ 7.31
Granted	2,767	9.47
Vested	(2,990)	7.50
Forfeited	(156)	8.27
Balance at December 31, 2022	3,499	\$ 8.93

The fair value of RSUs vested during the years ended December 31, 2022, 2021 and 2020 was \$22.4 million, \$18.3 million and \$15.5 million, respectively.

Share-based Compensation Cost

The following table sets forth the detailed allocation of the share-based compensation expense which was included in the Company's Consolidated Statements of Operations:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Share-based compensation expense included in:			
Cost of revenue	\$ 2,233	\$ 2,345	\$ 1,712
Research and development expense	7,519	7,164	4,850
Selling, general and administrative expense	15,460	14,547	11,478
Total	\$ 25,212	\$ 24,056	\$ 18,040
Share-based compensation expense by type of award:			
RSUs	17,786	14,573	11,522
PRSUs	3,865	6,231	4,022
MRSUs	1,558	1,304	711
Employee stock purchase rights under ESPP	2,003	1,948	1,785
Total	\$ 25,212	\$ 24,056	\$ 18,040

As of December 31, 2022, total unrecognized share-based compensation cost related to unvested RSUs was \$19.7 million and is expected to be recognized over a weighted-average period of approximately 1.4 years.

French Pension Plan

Under French law, the Company's subsidiaries in France are obligated to make certain payments to their employees upon their retirement from the Company. These payments are based on the retiring employee's salary for a number of months that varies according to the employee's period of service and position. Salary used in the calculation is the employee's average monthly salary for the twelve months prior to retirement. The payments are made in one lump-sum at the time of retirement. The French pension plan is unfunded and there are no contributions to the plan required by related laws or funding regulations. No required contributions are expected in fiscal 2023, but the Company, at its discretion, may make contributions to the defined benefit plan.

The Company's defined benefit pension obligations are measured annually as of December 31. The present value of these lump-sum payments is determined on an actuarial basis and the actuarial valuation considers the employees' age and period of service with the Company, projected mortality rates, mobility rates, increases in salaries and a discount rate.

The Company's pension obligations as of December 31, 2022 and 2021, and the changes to the Company's pension obligations for each of those years, were as follows:

(in thousands)

	2022	2021
Projected benefit obligation:		
Balance at January 1	\$ 6,003	\$ 6,057
Service cost	259	272
Interest cost	50	20
Actuarial (gains) losses	(626)	233
Benefits paid	(107)	(94)
Foreign currency translation adjustment	(296)	(485)
Balance at December 31	<u>\$ 5,283</u>	<u>\$ 6,003</u>
Presented on the Consolidated Balance Sheets as:		
Current portion (included in "Accrued and other current liabilities")	\$ 242	\$ 32
Long-term portion (included in "Other non-current liabilities")	\$ 5,041	\$ 5,971

The table below presents the components of net periodic benefit costs:

	Year ended December 31,		
(in thousands)	2022	2021	2020
Service cost	\$ 259	\$ 272	\$ 227
Interest cost	50	20	78
Net periodic benefit cost included in result of operations	<u>\$ 309</u>	<u>\$ 292</u>	<u>\$ 305</u>

The following assumptions were used in determining the Company's pension obligation:

	As of December 31,	
	2022	2021
Discount rate	3.3 %	0.9 %
Mobility rate	6.6 %	4.7 %
Salary progression rate	3.0 %	2.5 %

The Company evaluates the discount rate assumption annually. The discount rate is determined using the average yields on high-quality fixed-income securities that have maturities consistent with the timing of benefit payments.

The Company also evaluates other assumptions related to demographic factors, such as retirement age, mortality rates and turnover periodically, updating them to reflect experience and expectations for the future. The mortality assumption related to the Company's defined benefit pension plan used the most current mortality tables published by the French National Institute of Statistics and Economic Studies.

As of December 31, 2022, future benefits expected to be paid in each of the next five years, and in the aggregate for the five-year period thereafter are as follows (in thousands):

Year ending December 31,	
2023	\$ 242
2024	255
2025	395
2026	683
2027	534
2028 – 2032	3,436
Total	<u>\$ 5,545</u>

Valuation Assumptions

The Company estimates the fair value of stock purchase rights under the ESPP using a Black-Scholes option valuation model. The value of the stock purchase rights under the ESPP consists of: (1) the 15% discount on the purchase of the stock; (2) 85% of the fair value of the call option; and (3) 15% of the fair value of the put option. The call option and put option were valued using the Black-Scholes option pricing model. At the date of grant, the Company estimated the fair value of each stock purchase right granted under the ESPP using the following weighted average assumptions:

	Year ended December 31,		
	2022	2021	2020
Expected term (in years)	0.50	0.50	0.50
Volatility	47 %	45 %	56 %
Risk-free interest rate	1.4 %	0.1 %	0.9 %
Expected dividends	0.0 %	0.0 %	0.0 %

The expected term of the stock purchase right under ESPP represents the period of time from the beginning of the offering period to the purchase date. The Company uses its historical volatility for a period equivalent to the expected term to estimate the expected volatility. The risk-free interest rate that the Company uses in the Black-Scholes option valuation model is based on U.S. Treasury zero-coupon issues with remaining terms similar to the expected term. The Company has not paid and does not plan to pay any cash dividends in the foreseeable future.

The estimated weighted-average fair value per share of stock purchase rights under the ESPP, granted for the years ended December 31, 2022, 2021 and 2020 was \$2.91, \$2.24 and \$1.80, respectively.

NOTE 14: STOCKHOLDERS' EQUITY

Share Repurchase Program

On February 3, 2022, the Board of Directors authorized the Company to repurchase up to \$100 million of the Company's outstanding shares of common stock through February 2025. The Company is authorized to repurchase, from time-to-time, shares of its outstanding common stock through open market purchases and 10b5-1 trading plans, in accordance with applicable rules and regulations, at such time and such prices as management may decide. The program does not obligate the Company to repurchase any specific number of shares and may be discontinued at any time. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors.

During the fiscal year ended December 31, 2022, the company repurchased and retired approximately 0.6 million shares of the Company's common stock for an aggregate amount of \$5.1 million. As of December 31, 2022, approximately \$94.9 million of the share repurchase authorization remained available for repurchases under this program. There were no share repurchases authorized during fiscal year 2021 and 2020.

NOTE 15: INCOME TAXES

Income (loss) before income tax:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Domestic	\$ 24,680	\$ (5,688)	\$ (42,905)
Foreign	19,805	14,559	16,688
Income (loss) before income taxes	\$ 44,485	\$ 8,871	\$ (26,217)

Provision for (benefit from) income taxes:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Current:			
Federal	\$ 4,443	\$ 4	\$ 124
State	3,236	85	93
Foreign	3,730	2,469	2,103
Deferred:			
Foreign	4,894	(6,941)	734
Total provision for (benefit from) income taxes	\$ 16,303	\$ (4,383)	\$ 3,054

The difference between the tax provision at the statutory federal income tax rate and the provision for (benefit from) income tax as a percentage of income (loss) before income taxes (effective tax rate) for each period was as follows:

	Year ended December 31,		
	2022	2021	2020
Statutory U.S. federal income tax rate	21 %	21 %	21 %
Increase (reduction) in rate resulting from:			
State Taxes	7 %	— %	— %
Differential in rates on foreign earnings	1 %	42 %	(11)%
Change in valuation allowance	15 %	(113)%	(16)%
Change in liabilities for uncertain tax positions	— %	(2)%	— %
Non-deductible stock-based compensation	4 %	11 %	(2)%
Permanent differences	(1)%	— %	(2)%
Adjustments related to tax positions taken during prior years	(8)%	(3)%	— %
Research and development credits	(2)%	(10)%	— %
Other	— %	3 %	(2)%
Effective tax rate	37 %	(49)%	(12)%

The Company operates in multiple jurisdictions and its profits are taxed pursuant to the tax laws of these jurisdictions. The Company's effective income tax rate differs from the U.S. federal statutory rate primarily due to geographical mix of income and losses, full valuation allowance against U.S. federal and state deferred tax assets, foreign withholding taxes and income taxes on earnings from operations in foreign tax jurisdictions. The Company's effective income tax rate may be affected by changes in its interpretations of tax laws and tax agreements in any given jurisdiction, utilization of net operating loss and tax credit carry forwards, changes in geographical mix of income and expense, and changes in management's assessment of matters such as the ability to realize deferred tax assets, as well as one-time discrete items. During fiscal 2022, the Company recorded current tax expense in the United States, primarily due to mandatory capitalization and amortization of research and development expenses in the United States starting January 1, 2022, as required by the Tax Cuts and Jobs Act. During fiscal 2021, the Company recorded a one-time benefit of approximately \$8.6 million due to the release of valuation allowance on deferred tax assets in foreign jurisdictions due to its improved earnings in recent years and increasing future projected earnings.

The components of deferred taxes are as follows:

(in thousands)	As of December 31,	
	2022	2021
Deferred tax assets:		
Reserves and accruals	\$ 27,376	\$ 24,833
Net operating loss carryforwards	16,032	33,070
Research and development credit carryforwards	28,952	39,730
Deferred stock-based compensation	1,376	1,354
Intangibles	6,384	7,321
Operating lease liabilities	7,423	8,697
Capitalized research and development expenses	36,210	9,681
Other	1,139	31
Gross deferred tax assets	124,892	124,717
Valuation allowance	(101,020)	(90,247)
Gross deferred tax assets after valuation allowance	23,872	34,470
Deferred tax liabilities:		
Depreciation	(5,971)	(6,597)
Convertible notes	—	(3,652)
Operating lease right-of-use assets	(6,125)	(7,402)
Gross deferred tax liabilities	(12,096)	(17,651)
Net deferred tax assets	\$ 11,776	\$ 16,819

The following table summarizes the activities related to the Company's valuation allowance:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Balance at beginning of period	\$ 90,247	\$ 99,585	\$ 95,518
Additions	10,773	310	6,690
Deductions	—	(9,648)	(2,623)
Balance at end of period	\$ 101,020	\$ 90,247	\$ 99,585

Management regularly assesses the ability to realize deferred tax assets recorded based upon the weight of available evidence, including such factors as recent earnings history and expected future taxable income on a jurisdiction by jurisdiction basis. In the event that the Company changes its determination as to the amount of realizable deferred tax assets, the Company will adjust its valuation allowance with a corresponding impact to the provision for income taxes in the period in which such determination is made.

As of December 31, 2022, the Company had \$83.1 million, \$0.0 million, \$34.7 million of foreign, U.S. federal and state net operating loss ("NOL") carryforwards, respectively. Certain foreign NOLs expire beginning in 2026, if not utilized, while the majority of the foreign NOLs carryforward indefinitely. Certain U.S. states NOL carryforward expires at various dates beginning in 2029, if not utilized.

As of December 31, 2022, the Company had U.S. federal and California state tax credit carryforwards of \$3.4 million and \$35.5 million, respectively. If not utilized, the U.S. federal tax credit carryforwards will begin to expire in 2031, while the California tax credit carryforward will not expire.

In the event the Company experiences an ownership change within the meaning of Section 382 of the Internal Revenue Code ("IRC"), the Company's ability to utilize net operating losses, tax credits and other tax attributes may be limited.

The Company has not provided U.S. state income taxes and foreign withholding taxes, on approximately \$50.4 million of cumulative earnings for certain non-U.S. subsidiaries, because such earnings are intended to be indefinitely reinvested. Determination of the amount of unrecognized deferred tax liability for temporary differences related to investments in these non-U.S. subsidiaries that are essentially permanently in duration is not practicable.

The Company applies the provisions of the applicable accounting guidance regarding accounting for uncertainty in income taxes, which require application of a more-likely-than-not threshold to the recognition and derecognition of uncertain tax positions. If the recognition threshold is met, the applicable accounting guidance permits the recognition of a tax benefit measured at the largest amount of such tax benefit that, in the Company's judgment, is more than fifty percent likely to be realized upon settlement. It further requires that a change in judgment related to the expected ultimate resolution of uncertain tax positions to be recognized in earnings in the period in which such determination is made. The Company will continue to review its tax positions and provide for, or reverse, unrecognized tax benefits as issues arise. As of December 31, 2022, the Company had \$9.8 million of unrecognized future tax benefits that will have no or minimal impact on the effective tax rate in future periods if recognized due to a valuation allowance on such unrecognized tax benefits.

The following table summarizes the activities related to the Company's gross unrecognized tax benefits:

(in millions)	Year ended December 31,		
	2022	2021	2020
Balance at beginning of period	\$ 13.8	\$ 17.6	\$ 17.0
Increase in balance related to tax positions taken during current year	0.3	0.3	0.3
Decrease in balance as a result of a lapse of the applicable statutes of limitations	—	(0.2)	—
Increase in balance related to tax positions taken during prior years	—	—	0.3
Decrease in balance related to tax positions taken during prior years	(3.0)	(3.9)	—
Balance at end of period	\$ 11.1	\$ 13.8	\$ 17.6

The Company recognizes interest and penalties related to unrecognized tax positions in income tax expense on the Consolidated Statements of Operations. The net interest and penalties charges recorded for the years ended December 31, 2020 through 2022, were not material.

The 2018 through 2021 tax years generally remain subject to examination by U.S. federal and most state tax authorities. Net operating losses generated on a tax return basis by the Company for the 2016 to 2021 tax years and research and development credits for 2011 to 2021 tax years remain open to examination. In addition, the Company remains subject to income tax examination for several other jurisdictions, including in Switzerland for years after 2017, Israel for years after 2019, and France for years after 2016.

NOTE 16: EARNINGS PER SHARE

Basic net income (loss) per share is computed by dividing the net income (loss) attributable to common stockholders for the applicable period by the weighted average number of common shares outstanding during the period. Potentially dilutive shares, consisting of outstanding stock options, RSUs, ESPP awards, and the Company's Notes, are included in calculation of diluted net income (loss) per share when their effect is dilutive.

The following table sets forth the computation of the basic and diluted net income (loss) per share:

<i>(in thousands, except per share amounts)</i>	Year ended December 31,		
	2022	2021	2020
Numerator:			
Net income (loss)	\$ 28,182	\$ 13,254	\$ (29,271)
Denominator:			
Weighted average number of shares outstanding:			
Basic	105,080	101,484	96,971
2022 Notes	2,681	2,175	—
2024 Notes	2,441	653	—
Stock options	213	292	—
Restricted stock units	1,884	1,525	—
Stock purchase rights under ESPP	79	42	—
Diluted	112,378	106,171	96,971
Net income (loss) per share:			
Basic	\$ 0.27	\$ 0.13	\$ (0.30)
Diluted	\$ 0.25	\$ 0.12	\$ (0.30)

The following table presents the potentially dilutive shares that were excluded from the computation of diluted net income (loss) per share, because their effect was anti-dilutive:

<i>(in thousands)</i>	Year ended December 31,		
	2022	2021	2020
2020 Notes	—	—	312
2022 Notes	—	—	192
Stock options	—	8	1,603
Restricted stock units	38	27	3,041
Stock purchase rights under the ESPP	—	390	531
Total	38	425	5,679

The Company applies the treasury stock method to determine the potential dilutive effect of its convertible debt on earnings per share. The 2020 Notes, 2022 Notes, and 2024 Notes are excluded from the calculation of diluted earnings per share under the treasury stock method for the periods when their respective conversion prices exceeded the average market price for the Company's common stock. Under the if-converted method, the 2022 Notes and 2024 Notes have potential dilutive effect of 6.6 million shares and 13.3 million shares, respectively.

NOTE 17: SEGMENT INFORMATION, GEOGRAPHIC INFORMATION AND CUSTOMER CONCENTRATION

Segment Information

Operating segments are defined as components of an enterprise that engage in business activities for which separate financial information is available and evaluated by the Company's CODM, which for the Company is its Chief Executive Officer, in deciding how to allocate resources and assess performance. Based on the internal reporting structure, the Company consists of two operating segments: Video and Broadband. During the third quarter of fiscal 2022, the Company's Cable Access segment was renamed the Broadband segment to reflect a broader strategic view of the category. There has been no change to the composition of the segment; therefore, no prior periods were restated. The operating segments were determined based on the nature of the products offered. The Video segment provides video processing and production and playout solutions and services worldwide to broadcast and media companies, streaming new media companies, broadband operators, and satellite and telco Pay-TV service providers. The Broadband segment provides CableOS broadband access solutions and related services to broadband operators globally. A measure of assets by segment is not applicable as segment assets are not included in the discrete financial information provided to the CODM.

The following table provides summary financial information by reportable segment:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Video			
Revenue	\$ 274,189	\$ 288,507	\$ 242,510
Gross profit	165,618	169,468	132,092
Operating income	22,322	28,460	1,326
Broadband			
Revenue	\$ 350,768	\$ 218,642	\$ 136,321
Gross profit	153,031	93,191	66,661
Operating income	52,283	15,599	11,651
Total			
Revenue	\$ 624,957	\$ 507,149	\$ 378,831
Gross profit	\$ 318,649	\$ 262,659	\$ 198,753
Operating income	\$ 74,605	\$ 44,059	\$ 12,977

A reconciliation of the Company's total segment operating income to income (loss) before income taxes in as follows:

(in thousands)	Year ended December 31,		
	2022	2021	2020
Total segment operating income	\$ 74,605	\$ 44,059	\$ 12,977
Unallocated corporate expenses ⁽¹⁾	(3,874)	(681)	(3,416)
Stock-based compensation	(25,212)	(24,062)	(18,040)
Amortization of intangibles	—	(507)	(3,970)
Income (loss) from operations	45,519	18,809	(12,449)
Loss on convertible debt extinguishment	—	—	(1,362)
Non-operating expense, net	(1,034)	(9,938)	(12,406)
Income (loss) before income taxes	\$ 44,485	\$ 8,871	\$ (26,217)

(1) Together with amortization of intangibles and stock-based compensation, the Company does not allocate restructuring and related charges and certain other non-recurring charges to the operating income for each segment because management does not include this information in the measurement of the performance of the operating segments.

Geographic Information

Net revenue ⁽¹⁾:

(in thousands)

	Year ended December 31,		
	2022	2021	2020
United States	\$ 393,991	\$ 282,912	\$ 191,854
Other countries	230,966	224,237	186,977
Total	\$ 624,957	\$ 507,149	\$ 378,831

(1) Revenue is attributed to countries based on the location of the customer.

Other than the United States, no single country accounted for 10% or more of the Company's net revenues for the years ended December 31, 2022, 2021 and 2020.

Property and equipment, net:

(in thousands)

	As of December 31,	
	2022	2021
United States	\$ 25,395	\$ 29,740
Israel	10,621	8,715
France	3,372	3,656
Other countries	426	610
Total	\$ 39,814	\$ 42,721

Customer Concentration

One customer, Comcast, accounted for 39%, 26% and 20% of the Company's total net revenues during the years ended December 31, 2022, 2021 and 2020, respectively.

NOTE 18: COMMITMENTS AND CONTINGENCIES

Bank Guarantees and Standby Letters of Credit

As of December 31, 2022 and 2021, the Company has outstanding bank guarantees and standby letters of credit in aggregate of \$2.1 million and \$2.4 million, respectively, consisting of building leases and performance bonds issued to customers.

During 2017, one of the Company's subsidiaries entered into a \$2.0 million credit facility with a foreign bank for the purpose of issuing performance guarantees. The credit facility is secured by a \$2.2 million indemnity issued by the parent company. There were no amounts outstanding under this credit facility as of December 31, 2022 and 2021.

Indemnification

The Company is obligated to indemnify its officers and its directors pursuant to its bylaws and contractual indemnity agreements. The Company also indemnifies some of its suppliers and most of its customers for specified intellectual property matters pursuant to certain contractual arrangements, subject to certain limitations. The scope of these indemnities varies, but, in some instances, includes indemnification for damages and expenses (including reasonable attorneys' fees). There have been no amounts accrued in respect of the indemnification provisions through December 31, 2022.

Purchase Commitments

As of December 31, 2022, the Company had approximately \$143.4 million of commitments to purchase goods and services.

NOTE 19: LEGAL PROCEEDINGS

From time to time, the Company is involved in lawsuits as well as subject to various legal proceedings, claims, threats of litigation, and investigations in the ordinary course of business, including claims of alleged infringement of third-party patents and other intellectual property rights, commercial, employment, and other matters. The Company assesses potential liabilities in connection with each lawsuit and threatened lawsuits and accrues an estimated loss for these loss contingencies if both of the following conditions are met: information available prior to issuance of the financial statements indicates that it is probable that a liability has been incurred at the date of the financial statements and the amount of loss can be reasonably estimated. While certain matters to which the Company is a party specify the damages claimed, such claims may not represent reasonably probable losses. Given the inherent uncertainties of litigation, the ultimate outcome of these matters cannot be predicted at this time, nor can the amount of possible loss or range of loss, if any, be reasonably estimated.

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

We maintain “disclosure controls and procedures,” as such term is defined in Rule 13a-15(e) under the Exchange Act, that are designed to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure. In designing and evaluating our disclosure controls and procedures, management recognized that disclosure controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the disclosure controls and procedures are met. Additionally, in designing disclosure controls and procedures, our management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible disclosure controls and procedures. The design of any disclosure controls and procedures also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Based on their evaluation as of the end of the period covered by this Annual Report on Form 10-K, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective.

Management’s Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act). Management conducted an assessment of the effectiveness of the Company’s internal control over financial reporting based on the criteria set forth in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on the Company’s assessment, management concluded that its internal control over financial reporting was effective as of December 31, 2022.

The Company’s independent registered public accounting firm, Ernst & Young LLP, has audited the effectiveness of the Company’s internal control over financial reporting, as stated in their report which appears in Part II, Item 8 of this Form 10-K.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting during our fourth quarter of fiscal year 2022, which were identified in connection with management’s evaluation required by paragraph (d) of rules 13a-15 and 15d-15 under the Exchange Act, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. OTHER INFORMATION

None.

Item 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

Certain information required by Part III is omitted from this Annual Report on Form 10-K pursuant to Instruction G to Exchange Act Form 10-K, and the Registrant will file its definitive Proxy Statement for its 2023 Annual Meeting of Stockholders, pursuant to Regulation 14A of the Securities Exchange Act of 1934, as amended (the “2023 Proxy Statement”), not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, and certain information included in the 2023 Proxy Statement is incorporated herein by reference.

Item 10. *DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE*

The information required by this item will be set forth in the 2023 Proxy Statement and is incorporated herein by reference.

Harmonic has adopted a Code of Business Conduct and Ethics (the “Code”) that applies to all employees, including Harmonic’s Chief Executive Officer, Chief Financial Officer and Corporate Controller. The Code is available on the Company’s website at www.harmonicinc.com.

Harmonic intends to satisfy the disclosure requirement under Form 8-K regarding an amendment to, or waiver from, a provision of this Code of Ethics by posting such information on our website, at the address specified above, and, to the extent required by the listing standards of The NASDAQ Global Select Market, by filing a Current Report on Form 8-K with the Securities and Exchange Commission disclosing such information.

Item 11. *EXECUTIVE COMPENSATION*

The information required by this item will be set forth in the 2023 Proxy Statement and is incorporated herein by reference.

Item 12. *SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS*

Information related to security ownership of certain beneficial owners and security ownership of management and related stockholder matters will be set forth in the 2023 Proxy Statement and is incorporated herein by reference.

Item 13. *CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE*

The information required by this item will be set forth in the 2023 Proxy Statement and is incorporated herein by reference.

Item 14. *PRINCIPAL ACCOUNTING FEES AND SERVICES*

The information required by this item will be set forth in the 2023 Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. **EXHIBITS AND FINANCIAL STATEMENT SCHEDULES**

1. *Financial Statements.* See Index to Consolidated Financial Statements in Item 8 on page of this Annual Report on Form 10-K.

2. *Financial Statement Schedules.* Financial statement schedules have been omitted because the information is not required to be set forth herein, is not applicable or is included in the financial statements or the notes thereto.

3. *Exhibits.* The documents listed in the Exhibit Index of this Annual Report on Form 10-K are filed herewith or are incorporated by reference in this Annual Report on Form 10-K, in each case as indicated therein.

Exhibit Number	Description
3.1 (i)	Certificate of Incorporation of Harmonic Inc., as amended
3.2	Amended and Restated Bylaws of Harmonic Inc.
4.1 (ii)	Form of Common Stock Certificate
4.2 (iii)	Certificate of Designation of Rights, Preferences and Privileges of Series A Participating Preferred Stock of Harmonic Inc.
4.3 (iv)	Indenture, dated September 13, 2019, between the Company and U.S. Bank National Association
4.4 (v)	Supplemental Indenture, dated November 15, 2021 by and between the Company and U.S. Bank National Association
4.5 (iv)	Form of 2.00% Convertible Senior Note due 2024 (included in Exhibit 4.1)
4.6 (vi)	Description of Common Stock
4.7 (vii)	Indenture, dated June 2, 2020, by and between the Company and U.S. Bank National Association
4.8 (v)	Supplemental Indenture, dated November 25, 2021 by and between the Company and U.S. Bank National Association
4.9 (vii)	Form of 4.375% Convertible Senior Note due 2022 (included in Exhibit 4.1)
10.1 (ii)*	Form of Indemnification Agreement
10.2 (viii)*	1995 Stock Plan, as amended and restated on June 9, 2022
10.3 (ix)*	2002 Director Stock Plan, as amended and restated on June 8, 2021
10.4 (viii)*	2002 Employee Stock Purchase Plan, as amended and restated on June 9, 2022
10.5 (x)*	Amended and Restated Change of Control Severance Agreement between Harmonic Inc. and Patrick Harshman, effective March 20, 2018
10.6 (x)*	Form of Control Severance Agreement between Harmonic Inc. and each of Sanjay Kalra, Nimrod Ben-Natan, Ian Graham and Neven Haltmayer
10.7	Harmonic Inc. 2002 Director Stock Plan Restricted Stock Unit Agreement
10.8 (xii)	Professional Service Agreement between Harmonic Inc. and Plexus Services Corp., dated September 22, 2003
10.9 (xii)	Amendment, dated January 6, 2006, to the Professional Services Agreement for Manufacturing between Harmonic Inc. and Plexus Services Corp., dated September 22, 2003
10.10 (xii)	Addendum 1, dated November 26, 2007, to the Professional Services Agreement between Harmonic Inc. and Plexus Services Corp., dated September 22, 2003
10.11 (xi)	Harmonic Inc. 1995 Stock Plan Restricted Stock Unit Agreement
10.12 (xiii)	Credit Agreement, dated as of December 19, 2019, by and among Harmonic Inc. and Harmonic International GmbH, as co-borrowers, certain subsidiaries of Harmonic Inc. from time to time party thereto, as guarantors, and JPMorgan Chase Bank, N.A., as lender.
10.13 (vii)	First Amendment to Credit Agreement, dated as of May 28, 2020, by and among Harmonic Inc., Harmonic International GmbH and JPMorgan Chase Bank, N.A.
10.14 (xiv)	Second Amendment to Credit Agreement, dated as of October 30, 2020, by and among Harmonic Inc, Harmonic International GmbH and JP Morgan Chase Bank, N.A.

10.15 (xv)	Third Amendment to Credit Agreement, dated as of November 10, 2020, by and among Harmonic Inc., Harmonic International GmbH and JP Morgan Chase Bank, N.A.
10.16 (xix)	Fourth Amendment to Credit Agreement, dated as of October 28, 2022, by and among Harmonic Inc., Harmonic International GmbH and JP Morgan Chase Bank, N.A.
10.17 (xvi)	Cooperation Agreement, dated as of April 9, 2021, by and between Harmonic Inc. And Scopia Capital Management LP.
10.19(xvii)	Amendment to Cooperation Agreement, dated as of March 24, 2022, by and between Harmonic Inc. and Scopia Capital Management L.P
16.1 (xviii)	Letter dated March 4, 2021 from Armanino LLP to the Securities and Exchange Commission regarding a change in certifying accountant.
21.1	Subsidiaries of Harmonic Inc.
23.1	Consent of Independent Registered Public Accounting Firm
23.2	Consent of Armanino LLP - Independent Registered Accounting Firm
31.1	Certification of Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of Principal Financial Officer 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	The following materials from Registrant's Annual Report on Form 10-K for the year ended December 31, 2022, formatted in Inline Extensible Business Reporting Language (XBRL) includes: Consolidated Balance Sheets at December 31, 2022 and December 31, 2021; (ii) Consolidated Statements of Operations for the Years Ended December 31, 2022, December 31, 2021 and December 31, 2020; (iii) Consolidated Statements of Comprehensive Income (loss) for the Years Ended December 31, 2022, December 31, 2021 and December 31, 2020; (iv) Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2022, December 31, 2021 and December 31, 2020; (v) Consolidated Statements of Cash Flows for the Years Ended December 31, 2022, December 31, 2021 and December 31, 2020; and (vi) Notes to Consolidated Financial Statements.
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)

* Indicates a management contract or compensatory plan or arrangement relating to executive officers or directors of the Company.

† Registrant has omitted portions of this exhibit and filed such exhibit separately with the Securities and Exchange Commission pursuant to a grant of confidential treatment under Rule 406 promulgated under the Securities Act.

- (i) Previously filed as an exhibit to the Company's Annual Report on Form 10-K for the year ended December 31, 2001.
- (ii) Previously filed as an exhibit to the Company's Registration Statement on Form S-1 No. 33-90752.
- (iii) Previously filed as an exhibit to the Company's Current Report on Form 8-K dated July 25, 2002.
- (iv) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on September 16, 2019.
- (v) Previously filed as an exhibit to the Company's Annual Report on Form 10-K for the year ended December 31, 2021.
- (vi) Previously filed as an exhibit to the Company's Annual Report on Form 10-K for the year ended December 31, 2019.
- (vii) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on June 2, 2020.
- (viii) Previously filed as an exhibit to the Company's Registration Statement on Form S-8, dated August 22, 2022.
- (ix) Previously filed as an exhibit to the Company's Registration Statement on Form S-8, dated August 20, 2021.
- (x) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on March 26, 2018.
- (xi) Previously filed as an exhibit to the Company's Annual Report on Form 10-K for the year ended December 31, 2017.
- (xii) Previously filed as an exhibit to the Company's Current Annual Report on Form 10-K for the year ended December 31, 2008.
- (xiii) Previously filed as an exhibit to the Company's Current Report on Form 8-K, filed on December 26, 2019.
- (xiv) Previously filed as an exhibit to the Company's Periodic Report on Form 10-Q, dated November 2, 2020.

- (xv) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed November 17, 2020.
- (xvi) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on April 12, 2021.
- (xvii) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on March 29, 2022.
- (xviii) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on March 5, 2021.
- (xix) Previously filed as an exhibit to the Company's Current Report on Form 8-K filed on November 2, 2022.

Item 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15 (d) of the Securities Exchange Act of 1934, the Registrant, Harmonic Inc., a Delaware corporation, has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of San Jose, State of California, on February 28, 2023.

HARMONIC INC.

By: /s/ PATRICK J. HARSHMAN
Patrick J. Harshman
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report on Form 10-K has been signed by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ PATRICK J. HARSHMAN</u> (Patrick J. Harshman)	President & Chief Executive Officer (Principal Executive Officer)	February 28, 2023
<u>/s/ SANJAY KALRA</u> (Sanjay Kalra)	Chief Financial Officer (Principal Financial and Accounting Officer)	February 28, 2023
<u>/s/ PATRICK GALLAGHER</u> (Patrick Gallagher)	Chairperson	February 28, 2023
<u>/s/ SUSAN G. SWENSON</u> (Susan G. Swenson)	Director	February 28, 2023
<u>/s/ MITZI REAUGH</u> (Mitzi Reaugh)	Director	February 28, 2023
<u>/s/ DAVID KRALL</u> (David Krall)	Director	February 28, 2023
<u>/s/ DEBORAH L. CLIFFORD</u> (Deborah L. Clifford)	Director	February 28, 2023
<u>/s/ DAN WHALEN</u> (Dan Whalen)	Director	February 28, 2023
<u>/s/ SOPHIA KIM</u> (Sophia Kim)	Director	February 28, 2023

AMENDED AND RESTATED
BYLAWS
OF
HARMONIC INC.
(a Delaware corporation)

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AMENDED AND RESTATED

BYLAWS

OF

HARMONIC INC.

(a Delaware corporation)

ARTICLE I

CORPORATE OFFICES

1.1 REGISTERED OFFICE

The registered office of the corporation shall be fixed in the certificate of incorporation of the corporation.

1.2 OTHER OFFICES

The board of directors may at any time establish branch or subordinate offices at any place or places where the corporation is qualified to do business.

ARTICLE II

MEETINGS OF STOCKHOLDERS

2.1 PLACE OF MEETINGS

Meetings of stockholders shall be held at any place within or outside the State of Delaware designated by the board of directors. In the absence of any such designation, stockholders' meetings shall be held at the principal executive office of the corporation.

2.2 ANNUAL MEETING

The annual meeting of stockholders shall be held each year on a date and at a time designated by the board of directors. In the absence of such designation, the annual meeting of stockholders shall be held on the first Tuesday in May in each year at 9:00 a.m. However, if such day falls on a legal holiday, then the meeting shall be held at the same time and place on the next succeeding full business day. At the meeting, directors shall be elected, and any other proper business may be transacted.

2.3 SPECIAL MEETING

A special meeting of the stockholders may be called at any time by the board of directors, the chairman of the board of directors, or by the president, but such special meetings may not be called by any other person or persons except as otherwise required by General Corporation Law of Delaware or Section 3.4 herein. Only such business shall be considered at a special meeting of stockholders as shall have been stated in the notice for such meeting.

2.4 NOTICE OF STOCKHOLDERS' MEETINGS

All notices of meetings of stockholders shall be sent or otherwise given in accordance with Section 2.5 of these bylaws not less than ten (10) nor more than sixty (60) days before the date of the meeting. The notice shall specify the place, date and hour of the meeting and (i) in the case of a special meeting, the purpose or purposes for which the meeting is called (no business other than that specified in the notice may be transacted) or (ii) in the case of the annual meeting, those matters which the board of directors, at the time of giving the notice, intends to present for action by the stockholders (but any proper matter may be presented at the meeting for such action). The notice of any meeting at which directors are to be elected shall include the name of any nominee or nominees who, at the time of the notice, the board intends to present for election. Any previously scheduled meeting of the stockholders may be postponed, and (unless the certificate of incorporation otherwise provides) any special meeting of the stockholders may be cancelled, by resolution of the board of directors upon public notice given prior to the date previously scheduled for such meeting of stockholders.

2.5 ADVANCE NOTICE OF STOCKHOLDER NOMINEES AND STOCKHOLDER BUSINESS

(a) To be properly brought before an annual meeting or special meeting, nominations for the election of directors or other business must be (i) specified in the notice of meeting (or any supplement thereto) given by or at the direction of the board of directors, (ii) otherwise properly brought before the meeting by or at the direction of the board of directors or (iii) otherwise properly brought before the meeting by a stockholder who (x) is a stockholder of record at the time of the giving of notice required by this Section 2.5 and on the record date for the determination of stockholders entitled to vote at the meeting and (y) has timely complied in proper written form with the notice procedures set forth in this Section 2.5. In addition, for business to be properly brought before an annual meeting by a stockholder, such business must be a proper matter for stockholder action pursuant to these bylaws and applicable law. Except as otherwise required by General Corporation Law of Delaware or Section 3.4 herein, stockholders may not bring business before a special meeting of stockholders.

(b) For business to be properly brought before an annual meeting by a stockholder, the stockholder must have given timely notice thereof in proper written form to the Secretary of the corporation. To be timely, a stockholder's notice must be received by the Secretary

at the principal executive offices of the corporation not less than sixty (60) calendar days nor earlier than ninety (90) calendar days before the one-year anniversary of the date of the preceding year's annual meeting of stockholders; provided, however, that in the event that no annual meeting was held in the preceding year or the date of the annual meeting has been changed by more than thirty (30) days from the date of the preceding year's annual meeting, then notice by the stockholder to be timely must be so received not later than the close of business on the later of (i) ninety (90) calendar days prior to such annual meeting, or (ii) ten (10) calendar days following the day on which Public Announcement (as defined below) of the date of such annual meeting is first made. In no event shall any adjournment or postponement of an annual meeting or the announcement thereof commence a new time period for the giving of a stockholder's notice as described in this Section 2.5. "Public Announcement" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press or a comparable national news service or in a document publicly filed by the corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Securities Exchange Act of 1934, as amended, or any successor thereto (the "1934 Act"). To be in proper written form, a stockholder's notice to the Secretary shall set forth as to each matter the stockholder proposes to bring before the annual meeting: (1) a brief description of the business desired to be brought before the annual meeting and the reasons for conducting such business at the annual meeting, (2) the name and address, as they appear on the corporation's books, of the stockholder proposing such business and any Stockholder Associated Person (as defined below), (3) the class and number of shares of the corporation which are held of record or are beneficially owned by the stockholder or any Stockholder Associated Person and any derivative positions held or beneficially held by the stockholder or any Stockholder Associated Person, (4) whether and the extent to which any hedging or other transaction or series of transactions has been entered into by or on behalf of such stockholder or any Stockholder Associated Person with respect to any securities of the corporation, and a description of any other agreement, arrangement or understanding (including any short position or any borrowing or lending of shares), the effect of which is to mitigate loss to, or manage the risk or benefit from share price changes for, or increase or decrease the voting power of, such stockholder or any Stockholder Associated Person with respect to any securities of the corporation, (5) any material interest of the stockholder or a Stockholder Associated Person in such business and (6) a statement whether either such stockholder or any Stockholder Associated Person will deliver a proxy statement and form of proxy to holders of at least the percentage of the corporation's voting shares required under applicable law to carry the proposal (such information provided and statements made as required by clauses (1) through (6) constitute a "Business Solicitation Statement"). In addition, to be in proper written form, a stockholder's notice to the Secretary must be supplemented not later than ten (10) calendar days following the record date to disclose the information contained in clauses (3) and (4) above as of the record date (the "Supplement"). For purposes of this Section 2.5, a "Stockholder Associated Person" of any stockholder shall mean (x) any person controlling, directly or indirectly, or acting in concert with, such stockholder, (y) any beneficial owner of shares of stock of the corporation owned of record or beneficially by such stockholder and on whose behalf the proposal or nomination, as the case may be, is being made, or (z) any person controlling, controlled by or under common control with such person referred to in the preceding clauses (x) and (y). Without exception, no business proposed by a

stockholder shall be conducted at any annual meeting except in accordance with the procedures set forth in this Section 2.5. In addition, business proposed to be brought by a stockholder may not be brought before the annual meeting if such stockholder or a Stockholder Associated Person, as applicable, takes action contrary to the representations made in the Business Solicitation Statement or if the Business Solicitation Statement contains an untrue statement of a material fact or omits to state a material fact necessary to make the statements therein not misleading. The chairperson of the annual meeting shall, if the facts warrant, determine and declare at the meeting that business was not properly brought before the meeting and in accordance with the provisions of this Section 2.5, and, if the chairperson should so determine, he or she shall so declare at the meeting that any such business not properly brought before the meeting shall not be transacted.

(c) Only persons who are nominated in accordance with the procedures set forth in this Section 2.5(c) shall be eligible for election as directors. Nominations of persons for election to the board of directors of the corporation may be made at an annual meeting of stockholders by or at the direction of the board of directors or by any stockholder of the corporation entitled to vote in the election of directors at the meeting who timely complies with the notice procedures set forth in this paragraph 2.5(c). To be timely, such nominations, other than those made by or at the direction of the board of directors, shall be made pursuant to the notice provisions of Section 2.5(b), and shall be in proper written form as set forth in this Section 2.5(c). Nominations of persons for election to the board of directors of the corporation may be made at a special meeting of stockholders by a stockholder (if the business to be conducted at such meeting, as specified in the notice described in Section 2.4(i), includes the election of directors) if the notice required by this Section 2.5(c) shall be delivered to the Secretary of the corporation not later than the close of business on the later of ninety (90) calendar days prior to such special meeting or ten (10) calendar days following the day on which Public Announcement (as defined above) is first made of the date of the special meeting and of the nominees proposed by the board of directors to be elected at such meeting. To be in proper written form, a stockholder's notice delivered pursuant to this Section 2.5(c) shall set forth (i) as to each person (a "nominee") whom the stockholder proposes to nominate for election or re-election as a director: (A) the name, age, business address and residence address of the nominee, (B) the principal occupation or employment of the nominee, (C) the class and number of shares of the corporation which are held of record or are beneficially owned by the nominee and any derivative positions held or beneficially held by the nominee, (D) whether and the extent to which any hedging or other transaction or series of transactions has been entered into by or on behalf of the nominee with respect to any securities of the corporation, and a description of any other agreement, arrangement or understanding (including any short position or any borrowing or lending of shares), the effect or intent of which is to mitigate loss to, or manage the risk or benefit from share price changes for, or increase or decrease the voting power of the nominee with respect to any securities of the corporation, (E) a description of all arrangements or understandings between the stockholder and each nominee and any other person or persons (naming such person or persons) pursuant to which the nominations are to be made by the stockholder, (F) a written statement executed by the nominee acknowledging that as a director of the corporation, the nominee will owe fiduciary duties under Delaware law with respect to the corporation and its stockholders, and (G) any other information

relating to the nominee that would be required to be disclosed about such nominee if proxies were being solicited for the election of the nominee as a director, or is otherwise required, in each case pursuant to Regulation 14A under the 1934 Act (including without limitation the nominee's written consent to being named in the proxy statement, if any, as a nominee and to serving as a director if elected); and (ii) as to such stockholder giving notice, (x) the information required to be provided in a stockholder's notice pursuant to clauses (2) through (5) of Section 2.5(b) and the Supplement referenced in Section 2.5(b) (except that the references to "business" in such Section 2.5(b) shall instead refer to nominations of directors for purposes of this Section 2.5(c)), and (y) a statement whether either such stockholder or Stockholder Associated Person will deliver a proxy statement and form of proxy to holders of a number of the corporation's voting shares reasonably believed by such stockholder or Stockholder Associated Person to be necessary to elect such nominee(s) (such information provided and statements made as required by preceding clauses (i) and (ii) above constitute a "Nominee Solicitation Statement"). At the request of the board of directors, any person nominated by a stockholder for election as a director shall furnish to the Secretary of the corporation (1) that information required to be set forth in the stockholder's Nominee Solicitation Statement as of a date subsequent to the date on which the notice of such person's nomination was given and (2) such other information as may reasonably be required by the corporation to determine the eligibility of such proposed nominee to serve as independent director of the corporation or that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of such nominee; in the absence of the furnishing of such information if requested, such stockholder's nomination shall not be considered in proper form pursuant to this Section 2.5(c). Without exception, no person nominated by a stockholder shall be eligible for election or re-election as a director of the corporation unless nominated in accordance with the procedures set forth in this Section 2.5(c). In addition, a nominee shall not be eligible for election or re-election if a stockholder or Stockholder Associated Person, as applicable, takes action contrary to the representations made in the Nominee Solicitation Statement or if the Nominee Solicitation Statement contains an untrue statement of a material fact or omits to state a material fact necessary to make the statements therein not misleading. The chairperson of the meeting shall, if the facts warrant, determine and declare at the meeting that a nomination was not made in accordance with the procedures prescribed by these bylaws, and if the chairperson should so determine, he or she shall so declare at the meeting, and the defective nomination shall be disregarded.

(d) In addition to the foregoing provisions of this Section 2.5, a stockholder must also comply with all applicable requirements of state law and of the 1934 Act and the rules and regulations thereunder with respect to the matters set forth in this Section 2.5, including with respect to business such stockholder intends to bring before the annual meeting that involves a proposal or nomination that such stockholder requests to be included in the corporation's proxy statement, the requirements of Rule 14a-8 (or any successor provision) under the 1934 Act. Nothing in this Section 2.5 shall be deemed to affect any right of the corporation to omit a proposal from the corporation's proxy statement pursuant to Rule 14a-8 (or any successor provision) under the 1934 Act.

2.6 MANNER OF GIVING NOTICE; AFFIDAVIT OF NOTICE

Written notice of any meeting of stockholders shall be given either personally or by first-class mail or by telegraphic or other written communication. Notices not personally delivered shall be sent charges prepaid and shall be addressed to the stockholder at the address of that stockholder appearing on the books of the corporation or given by the stockholder to the corporation for the purpose of notice. Notice shall be deemed to have been given at the time when delivered personally or deposited in the mail or sent by telegram or other means of written communication. If any notice addressed to a stockholder at the address of that stockholder appearing on the books of the corporation is returned to the corporation by the United States Postal Service marked to indicate that the United States Postal Service is unable to deliver the notice to the stockholder at that address, then all future notices or reports shall be deemed to have been duly given without further mailing if the same shall be available to the stockholder on written demand of the stockholder at the principal executive office of the corporation for a period of one (1) year from the date of the giving of the notice.

An affidavit of the mailing or other means of giving any notice of any stockholders' meeting, executed by the secretary, assistant secretary or any transfer agent of the corporation giving the notice, shall be prima facie evidence of the giving of such notice.

2.7 QUORUM

The holders of a majority in voting power of the stock issued and outstanding and entitled to vote thereat, present in person or represented by proxy at the meeting, shall constitute a quorum at all meetings of the stockholders for the transaction of business except as otherwise provided by statute or by the certificate of incorporation. If, however, such quorum is not present or represented at any meeting of the stockholders, then either (i) the chairman of the meeting or (ii) the holders of a majority of the shares represented at the meeting and entitled to vote thereat, present in person or represented by proxy, shall have power to adjourn the meeting in accordance with Section 2.8 of these bylaws.

When a quorum is present at any meeting, the vote of the holders of a majority of the stock having voting power present in person or represented by proxy shall decide any question brought before such meeting, unless the question is one upon which, by express provision of the laws of the State of Delaware or of the certificate of incorporation or these bylaws, a different vote is required, in which case such express provision shall govern and control the decision of the question.

If a quorum be initially present, the stockholders may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum, if any action taken is approved by a majority of the stockholders initially constituting the quorum.

2.8 ADJOURNED MEETING; NOTICE

Any stockholders' meeting, annual or special, whether or not a quorum is present, may be adjourned from time to time by (i) the chairman of the meeting or (ii) the stockholders by the vote of the holders of a majority of the shares represented at that meeting and entitled to vote thereat, either in person or by proxy. In the absence of a quorum, no other business may be transacted at that meeting except as provided in Section 2.7 of these bylaws.

When a meeting is adjourned to another time and place, unless these bylaws otherwise require, notice need not be given of the adjourned meeting if the time and place thereof are announced at the meeting at which the adjournment is taken. In no event shall the public announcement of an adjournment of a stockholders meeting commence a new time period for the giving of a stockholder's notice as described in Section 2.5(b) or 2.5(c) herein. At the adjourned meeting the corporation may transact any business that might have been transacted at the original meeting. If the adjournment is for more than thirty (30) days, or if after the adjournment a new record date is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

2.9 VOTING

The stockholders entitled to vote at any meeting of stockholders shall be determined in accordance with the provisions of Section 2.12 of these bylaws, subject to the provisions of Sections 217 and 218 of the General Corporation Law of Delaware (relating to voting rights of fiduciaries, pledgors and joint owners, and to voting trusts and other voting agreements).

Except as may be otherwise provided in the certificate of incorporation or these bylaws, each stockholder shall be entitled to one vote for each share of capital stock held by such stockholder. Any stockholder entitled to vote on any matter may vote part of the shares in favor of the proposal and refrain from voting the remaining shares or, except when the matter is the election of directors, may vote them against the proposal; but, if the stockholder fails to specify the number of shares which the stockholder is voting affirmatively, it will be conclusively presumed that the stockholder's approving vote is with respect to all shares which the stockholder is entitled to vote.

2.10 VALIDATION OF MEETINGS; WAIVER OF NOTICE; CONSENT

The transactions of any meeting of stockholders, either annual or special, however called and noticed, and wherever held, shall be as valid as though they had been taken at a meeting duly held after regular call and notice, if a quorum be present either in person or by proxy, and if, either before or after the meeting, each person entitled to vote, who was not present in person or by proxy, signs a written waiver of notice or a consent to the holding of the meeting or an approval of the minutes thereof. The waiver of notice or consent or approval need not specify either the business to be transacted or the purpose of any annual or special meeting of stockholders. All such waivers, consents, and approvals shall be filed with the corporate records or made a part of the minutes of the meeting.

Attendance by a person at a meeting shall also constitute a waiver of notice of and presence at that meeting, except when the person objects at the beginning of the meeting to the transaction of any business because the meeting is not lawfully called or convened. Attendance at a meeting is not a waiver of any right to object to the consideration of matters required by law to be included in the notice of the meeting but not so included, if that objection is expressly made at the meeting.

2.11 STOCKHOLDER ACTION BY WRITTEN CONSENT WITHOUT A MEETING

Any action required or permitted to be taken at any annual or special meeting of stockholders may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing setting forth the action so taken shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted. Such consents shall be delivered to the corporation by delivery to its registered office in the state of Delaware, its principal place of business, or an officer or agent of the corporation having custody of the book in which proceedings of meetings of stockholders are recorded. Delivery made to a corporation's registered office shall be by hand or by certified or registered mail, return receipt requested.

2.12 RECORD DATE FOR STOCKHOLDER NOTICE; VOTING

For purposes of determining the stockholders entitled to notice of any meeting or to vote thereat or entitled to give consent to corporate action without a meeting, the board of directors may fix, in advance, a record date, which shall not precede the date upon which the resolution fixing the record date is adopted by the board of directors and which shall not be more than sixty (60) days nor less than ten (10) days before the date of any such meeting, and in such event only stockholders of record on the date so fixed are entitled to notice and to vote, notwithstanding any transfer of any shares on the books of the corporation after the record date.

If the board of directors does not so fix a record date:

(a) the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the business day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the business day next preceding the day on which the meeting is held; and

(b) the record date for determining stockholders entitled to give consent to corporate action in writing without a meeting, (i) when no prior action by the board is required, shall be the day on which the first written consent is delivered to the corporation as provided in Section 2.3(b) of the General Corporation Law of Delaware, or (ii) when prior action by the board is required, shall be at the close of business on the day on which the board adopts the resolution relating to that action.

A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting unless the board of directors fixes a new record date for the adjourned meeting, but the board of directors shall fix a new record date if the meeting is adjourned for more than thirty (30) days from the date set for the original meeting.

The record date for any other purpose shall be as provided in Section 8.1 of these bylaws.

2.13 PROXIES

Every person entitled to vote for directors, or on any other matter, shall have the right to do so either in person or by one or more agents authorized by a written proxy signed by the person and filed with the secretary of the corporation, but no such proxy shall be voted or acted upon after three (3) years from its date, unless the proxy provides for a longer period. A proxy shall be deemed signed if the stockholder's name is placed on the proxy (whether by manual signature, typewriting, telegraphic transmission, telefacsimile or otherwise) by the stockholder or the stockholder's attorney-in-fact. The revocability of a proxy that states on its face that it is irrevocable shall be governed by the provisions of Section 212(e) of the General Corporation Law of Delaware.

2.14 ORGANIZATION

The president, or in the absence of the president, the chairman of the board, shall call the meeting of the stockholders to order, and shall act as chairman of the meeting. In the absence of the president, the chairman of the board, and all of the vice presidents, the stockholders shall appoint a chairman for such meeting. The chairman of any meeting of stockholders shall determine the order of business and the procedures at the meeting, including such matters as the regulation of the manner of voting and the conduct of business. The secretary of the corporation shall act as secretary of all meetings of the stockholders, but in the absence of the secretary at any meeting of the stockholders, the chairman of the meeting may appoint any person to act as secretary of the meeting.

2.15 LIST OF STOCKHOLDERS ENTITLED TO VOTE

The officer who has charge of the stock ledger of the corporation shall prepare and make, at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, during ordinary business hours, for a period of at least ten (10) days prior to the meeting, either at a place within the city where the meeting is to be held, which place shall be specified in the notice of the meeting, or, if not so specified, at the place where the meeting is to be held. The list shall also be produced and kept at the time and place of the meeting during the whole time thereof, and may be inspected by any stockholder who is present.

2.16 INSPECTORS OF ELECTION

Before any meeting of stockholders, the board of directors may appoint an inspector or inspectors of election to act at the meeting or its adjournment. If no inspector of election is so appointed, then the chairman of the meeting may, and on the request of any stockholder or a stockholder's proxy shall, appoint an inspector or inspectors of election to act at the meeting. The number of inspectors shall be either one (1) or three (3). If inspectors are appointed at a meeting pursuant to the request of one (1) or more stockholders or proxies, then the holders of a majority of shares or their proxies present at the meeting shall determine whether one (1) or three (3) inspectors are to be appointed. If any person appointed as inspector fails to appear or fails or refuses to act, then the chairman of the meeting may, and upon the request of any stockholder or a stockholder's proxy shall, appoint a person to fill that vacancy.

Such inspectors shall:

- (a) determine the number of shares outstanding and the voting power of each, the number of shares represented at the meeting, the existence of a quorum, and the authenticity, validity, and effect of proxies;
- (b) receive votes, ballots or consents;
- (c) hear and determine all challenges and questions in any way arising in connection with the right to vote;
- (d) count and tabulate all votes or consents;
- (e) determine when the polls shall close;
- (f) determine the result; and

- (g) do any other acts that may be proper to conduct the election or vote with fairness to all stockholders.

ARTICLE III

DIRECTORS

3.1 POWERS

Subject to the provisions of the General Corporation Law of Delaware and to any limitations in the certificate of incorporation or these bylaws relating to action required to be approved by the stockholders or by the outstanding shares, the business and affairs of the corporation shall be managed and shall be exercised by or under the direction of the board of directors. In addition to the powers and authorities these bylaws expressly confer upon them, the board of directors may exercise all such powers of the corporation and do all such lawful acts and things as are not by the General Corporation Law of Delaware or by the certificate of incorporation or by these bylaws required to be exercised or done by the stockholders.

3.2 NUMBER OF DIRECTORS

The board of directors shall consist of eight (8) members. The number of directors may be changed by an amendment to this bylaw, duly adopted by the board of directors or by the stockholders, or by a duly adopted amendment to the certificate of incorporation. No reduction of the authorized number of directors shall have the effect of removing any director before that director's term of office expires. If for any cause, the directors shall not have been elected at an annual meeting, they may be elected as soon thereafter as convenient at a special meeting of the stockholders called for that purpose in the manner provided in these Bylaws.

3.3 ELECTION AND TERM OF OFFICE OF DIRECTORS

Except as provided in Section 3.4 of these bylaws, directors shall be elected at each annual meeting of stockholders to hold office until the next annual meeting. Each director, including a director elected or appointed to fill a vacancy, shall hold office until the expiration of the term for which elected and until such director's successor has been elected and qualified or until such director's earlier resignation or removal.

3.4 RESIGNATION AND VACANCIES

Any director may resign effective on giving written notice to the chairman of the board, the president, the secretary or the board of directors, unless the notice specifies a later time for that resignation to become effective. If the resignation of a director is effective at a future time, the board of directors may elect a successor to take office when the resignation becomes effective.

Vacancies in the board of directors may be filled by a majority of the remaining directors, even if less than a quorum, or by a sole remaining director; however, a vacancy created by the removal of a director by the vote of the stockholders or by court order may be filled only by the affirmative vote of a majority of the shares represented and voting at a duly held meeting at which a quorum is present (which shares voting affirmatively also constitute a majority of the required quorum). Each director so elected shall hold office until the next annual meeting of the stockholders and until a successor has been elected and qualified.

Unless otherwise provided in the certificate of incorporation or these bylaws:

(i) Vacancies and newly created directorships resulting from any increase in the authorized number of directors elected by all of the stockholders having the right to vote as a single class may be filled by a majority of the directors then in office, although less than a quorum, or by a sole remaining director.

(ii) Whenever the holders of any class or classes of stock or series thereof are entitled to elect one or more directors by the provisions of the certificate of incorporation, vacancies and newly created directorships of such class or classes or series may be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected.

Any directors chosen pursuant to this Section 3.4 shall hold office for a term expiring at the next annual meeting of stockholders and until such director's successor shall have been duly elected and qualified.

If at any time, by reason of death or resignation or other cause, the corporation should have no directors in office, then any officer or any stockholder or an executor, administrator, trustee or guardian of a stockholder, or other fiduciary entrusted with like responsibility for the person or estate of a stockholder, may call a special meeting of stockholders in accordance with the provisions of the certificate of incorporation or these bylaws, or may apply to the Court of Chancery for a decree summarily ordering an election as provided in Section 211 of the General Corporation Law of Delaware.

If, at the time of filling any vacancy or any newly created directorship, the directors then in office constitute less than a majority of the whole board (as constituted immediately prior to any such increase), then the Court of Chancery may, upon application of any stockholder or stockholders holding at least ten percent (10%) of the total number of the shares at the time outstanding having the right to vote for such directors, summarily order an election to be held to fill any such vacancies or newly created directorships, or to replace the directors chosen by the directors then in office as aforesaid, which election shall be governed by the provisions of Section 211 of the General Corporation Law of Delaware as far as applicable.

3.5 REMOVAL OF DIRECTORS

Unless otherwise restricted by statute, by the certificate of incorporation or by these bylaws, any director or the entire board of directors may be removed, with or without cause, by the holders of a majority of the shares then entitled to vote at an election of directors; provided, however, that, if and so long as stockholders of the corporation are entitled to cumulative voting, if less than the entire board is to be removed, no director may be removed without cause if the votes cast against his removal would be sufficient to elect him if then cumulatively voted at an election of the entire board of directors.

3.6 PLACE OF MEETINGS; MEETINGS BY TELEPHONE

Regular meetings of the board of directors may be held at any place within or outside the State of Delaware that has been designated from time to time by resolution of the board. In the absence of such a designation, regular meetings shall be held at the principal executive office of the corporation. Special meetings of the board may be held at any place within or outside the State of Delaware that has been designated in the notice of the meeting or, if not stated in the notice or if there is no notice, at the principal executive office of the corporation.

Any meeting of the board, regular or special, may be held by conference telephone or similar communication equipment, so long as all directors participating in the meeting can hear one another; and all such participating directors shall be deemed to be present in person at the meeting.

3.7 FIRST MEETINGS

The first meeting of each newly elected board of directors shall be held at such time and place as shall be fixed by the vote of the stockholders at the annual meeting. In the event of the failure of the stockholders to fix the time or place of such first meeting of the newly elected board of directors, or in the event such meeting is not held at the time and place so fixed by the stockholders, the meeting may be held at such time and place as shall be specified in a notice given as hereinafter provided for special meetings of the board of directors, or as shall be specified in a written waiver signed by all of the directors.

3.8 REGULAR MEETINGS

Regular meetings of the board of directors may be held without notice at such time as shall from time to time be determined by the board of directors. If any regular meeting day shall fall on a legal holiday, then the meeting shall be held at the same time and place on the next succeeding full business day.

3.9 SPECIAL MEETINGS; NOTICE

Special meetings of the board of directors for any purpose or purposes may be called at any time by the chairman of the board of directors, the president, any vice president, the secretary or any two directors.

The person or persons authorized to call special meetings of the board of directors may fix the time and place of the meetings. Notice of the time and place of special meetings shall be delivered personally or by telephone to each director or sent by first-class mail, courier service or telegram, telecopy or other electronic or wireless means, charges prepaid, addressed to each director at that director's address as it is shown on the records of the corporation. If the notice is by mail, such notice shall be deposited in the United States mail at least four (4) days before the time of the holding of the meeting. If the notice is by courier service, telegram, overnight mail, telecopy or other electronic or wireless means, such notice shall be deemed adequately delivered when the notice is transmitted at least twenty-four (24) hours prior to the time set for such meeting. If the notice is by telephone or by hand delivery, such notice shall be deemed adequately delivered when the notice is given at least twenty-four (24) hours prior to the time set for such meeting. Any oral notice given personally or by telephone may be communicated either to the director or to a person at the office of the director who the person giving the notice has reason to believe will promptly communicate it to the director. The notice need not specify the purpose or the place of the meeting, if the meeting is to be held at the principal executive office of the corporation.

3.10 QUORUM

A majority of the authorized number of directors shall constitute a quorum for the transaction of business, except to adjourn as provided in Section 3.12 of these bylaws. Every act or decision done or made by a majority of the directors present at a duly held meeting at which a quorum is present shall be regarded as the act of the board of directors, subject to the provisions of the certificate of incorporation and applicable law.

A meeting at which a quorum is initially present may continue to transact business notwithstanding the withdrawal of directors, if any action taken is approved by at least a majority of the quorum for that meeting.

3.11 WAIVER OF NOTICE

Notice of a meeting need not be given to any director (i) who signs a waiver of notice, whether before or after the meeting, or (ii) who attends the meeting without protesting, prior thereto or at its commencement, the lack of notice to such directors. All such waivers shall be filed with the corporate records or made part of the minutes of the meeting. A waiver of notice need not specify the purpose of any regular or special meeting of the board of directors.

3.12 ADJOURNMENT

A majority of the directors present, whether or not constituting a quorum, may adjourn any meeting of the board to another time and place.

3.13 NOTICE OF ADJOURNMENT

Notice of the time and place of holding an adjourned meeting of the board need not be given unless the meeting is adjourned for more than twenty-four (24) hours. If the meeting is adjourned for more than twenty-four (24) hours, then notice of the time and place of the adjourned meeting shall be given before the adjourned meeting takes place, in the manner specified in Section 3.9 of these bylaws, to the directors who were not present at the time of the adjournment.

3.14 BOARD ACTION BY WRITTEN CONSENT WITHOUT A MEETING

Any action required or permitted to be taken by the board of directors may be taken without a meeting, provided that all members of the board individually or collectively consent in writing to that action. Such action by written consent shall have the same force and effect as a unanimous vote of the board of directors. Such written consent and any counterparts thereof shall be filed with the minutes of the proceedings of the board of directors.

3.15 FEES AND COMPENSATION OF DIRECTORS

Directors and members of committees may receive such compensation, if any, for their services and such reimbursement of expenses as may be fixed or determined by resolution of the board of directors. This Section 3.15 shall not be construed to preclude any director from serving the corporation in any other capacity as an officer, agent, employee or otherwise and receiving compensation for those services.

3.16 APPROVAL OF LOANS TO OFFICERS

The corporation may lend money to, or guarantee any obligation of, or otherwise assist any officer or other employee of the corporation or any of its subsidiaries, including any officer or employee who is a director of the corporation or any of its subsidiaries, whenever, in the judgment of the directors, such loan, guaranty or assistance may reasonably be expected to benefit the corporation. The loan, guaranty or other assistance may be with or without interest and may be unsecured, or secured in such manner as the board of directors shall approve, including, without limitation, a pledge of shares of stock of the corporation. Nothing contained in this section shall be deemed to deny, limit or restrict the powers of guaranty or warranty of the corporation at common law or under any statute.

3.17 SOLE DIRECTOR PROVIDED BY CERTIFICATE OF INCORPORATION

In the event only one director is required by these bylaws or the certificate of incorporation, then any reference herein to notices, waivers, consents, meetings or other actions by a majority or quorum of the directors shall be deemed to refer to such notice, waiver, etc., by such sole director, who shall have all the rights and duties and shall be entitled to exercise all of the powers and shall assume all the responsibilities otherwise herein described as given to the board of directors.

ARTICLE IV

COMMITTEES

4.1 COMMITTEES OF DIRECTORS

The board of directors may, by resolution adopted by a majority of the authorized number of directors, designate one (1) or more committees, each consisting of two or more directors, to serve at the pleasure of the board. The board may designate one (1) or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. The appointment of members or alternate members of a committee requires the vote of a majority of the authorized number of directors. Any committee, to the extent provided in the resolution of the board, shall have and may exercise all the powers and authority of the board, but no such committee shall have the power or authority to (i) amend the certificate of incorporation (except that a committee may, to the extent authorized in the resolution or resolutions providing for the issuance of shares of stock adopted by the board of directors as provided in Section 151(a) of the General Corporation Law of Delaware, fix the designations and any of the preferences or rights of such shares relating to dividends, redemption, dissolution, any distribution of assets of the corporation or the conversion into, or the exchange of such shares for, shares of any other class or classes or any other series of the same or any other class or classes of stock of the corporation), (ii) adopt an agreement of merger or consolidation under Sections 251 or 252 of the General Corporation Law of Delaware, (iii) recommend to the stockholders the sale, lease or exchange of all or substantially all of the corporation's property and assets, (iv) recommend to the stockholders a dissolution of the corporation or a revocation of a dissolution or (v) amend the bylaws of the corporation; and, unless the board resolution establishing the committee, the bylaws or the certificate of incorporation expressly so provide, no such committee shall have the power or authority to declare a dividend, to authorize the issuance of stock, or to adopt a certificate of ownership and merger pursuant to Section 253 of the General Corporation Law of Delaware.

4.2 MEETINGS AND ACTION OF COMMITTEES

Meetings and actions of committees shall be governed by, and held and taken in accordance with, the following provisions of Article III of these bylaws: Section 3.6 (place of meetings; meetings by telephone), Section 3.8 (regular meetings), Section 3.9 (special meetings; notice), Section 3.10 (quorum), Section 3.11 (waiver of notice), Section 3.12 (adjournment), Section 3.13 (notice of adjournment) and Section 3.14 (board action by written consent without meeting), with such changes in the context of those bylaws as are necessary to substitute the committee and its members for the board of directors and its members; provided, however, that the time of regular meetings of committees may be determined either by resolution of the board of directors or by resolution of the committee, that special meetings of committees may also be called by resolution of the board of directors, and that notice of special meetings of committees shall also be given to all alternate members, who shall have the right to attend all meetings of the committee. The board of directors may adopt rules for the government of any committee not inconsistent with the provisions of these bylaws.

4.3 COMMITTEE MINUTES

Each committee shall keep regular minutes of its meetings and report the same to the board of directors when required.

ARTICLE V

OFFICERS

5.1 OFFICERS

The Corporate Officers of the corporation shall be a president, a secretary and a chief financial officer. The corporation may also have, at the discretion of the board of directors, a chairman of the board, one or more vice presidents (however denominated), one or more assistant secretaries, one or more assistant treasurers and such other officers as may be appointed in accordance with the provisions of Section 5.3 of these bylaws. Any number of offices may be held by the same person.

In addition to the Corporate Officers of the Company described above, there may also be such Administrative Officers of the corporation as may be designated and appointed from time to time by the president of the corporation in accordance with the provisions of Section 5.12 of these bylaws.

5.2 ELECTION OF OFFICERS

The Corporate Officers of the corporation, except such officers as may be appointed in accordance with the provisions of Section 5.3 or Section 5.5 of these bylaws, shall be chosen by the board of directors, subject to the rights, if any, of an officer under any contract of employment, and shall hold their respective offices for such terms as the board of directors may from time to time determine.

5.3 SUBORDINATE OFFICERS

The board of directors may appoint, or may empower the president to appoint, such other Corporate Officers as the business of the corporation may require, each of whom shall hold office for such period, have such power and authority, and perform such duties as are provided in these bylaws or as the board of directors may from time to time determine.

The president may from time to time designate and appoint Administrative Officers of the corporation in accordance with the provisions of Section 5.12 of these bylaws.

5.4 REMOVAL AND RESIGNATION OF OFFICERS

Subject to the rights, if any, of a Corporate Officer under any contract of employment, any Corporate Officer may be removed, either with or without cause, by the board of directors at any regular or special meeting of the board or, except in case of a Corporate Officer chosen by the board of directors, by any Corporate Officer upon whom such power of removal may be conferred by the board of directors.

Any Corporate Officer may resign at any time by giving written notice to the corporation. Any resignation shall take effect at the date of the receipt of that notice or at any later time specified in that notice; and, unless otherwise specified in that notice, the acceptance of the resignation shall not be necessary to make it effective. Any resignation is without prejudice to the rights, if any, of the corporation under any contract to which the Corporate Officer is a party.

Any Administrative Officer designated and appointed by the president may be removed, either with or without cause, at any time by the president. Any Administrative Officer may resign at any time by giving written notice to the president or to the secretary of the corporation.

5.5 VACANCIES IN OFFICES

A vacancy in any office because of death, resignation, removal, disqualification or any other cause shall be filled in the manner prescribed in these bylaws for regular appointments to that office.

5.6 CHAIRMAN OF THE BOARD

The chairman of the board, if such an officer be elected, shall, if present, preside at meetings of the board of directors and exercise such other powers and perform such other duties as may from time to time be assigned to him by the board of directors or as may be prescribed by these bylaws. If there is no president, then the chairman of the board shall also be the chief executive officer of the corporation and shall have the powers and duties prescribed in Section 5.7 of these bylaws.

5.7 PRESIDENT

Subject to such supervisory powers, if any, as may be given by the board of directors to the chairman of the board, if there be such an officer, the president shall be the chief executive officer of the corporation and shall, subject to the control of the board of directors, have general supervision, direction and control of the business and the officers of the corporation. He or she shall preside at all meetings of the stockholders and, in the absence or nonexistence of a chairman of the board, at all meetings of the board of directors. He or she shall have the general powers and duties of management usually vested in the office of president of a corporation, and shall have such other powers and perform such other duties as may be prescribed by the board of directors or these bylaws.

5.8 VICE PRESIDENTS

In the absence or disability of the president, and if there is no chairman of the board, the vice presidents, if any, in order of their rank as fixed by the board of directors or, if not ranked, a vice president designated by the board of directors, shall perform all the duties of the president and when so acting shall have all the powers of, and be subject to all the restrictions upon, the president. The vice presidents shall have such other powers and perform such other duties as from time to time may be prescribed for them respectively by the board of directors, these bylaws, the president or the chairman of the board.

5.9 SECRETARY

The secretary shall keep or cause to be kept, at the principal executive office of the corporation or such other place as the board of directors may direct, a book of minutes of all meetings and actions of the board of directors, committees of directors and stockholders. The minutes shall show the time and place of each meeting, whether regular or special (and, if special, how authorized and the notice given), the names of those present at directors' meetings or committee meetings, the number of shares present or represented at stockholders' meetings and the proceedings thereof.

The secretary shall keep, or cause to be kept, at the principal executive office of the corporation or at the office of the corporation's transfer agent or registrar, as determined by resolution of the board of directors, a share register or a duplicate share register, showing the names of all stockholders and their addresses, the number and classes of shares held by each, the number and date of certificates evidencing such shares and the number and date of cancellation of every certificate surrendered for cancellation.

The secretary shall give, or cause to be given, notice of all meetings of the stockholders and of the board of directors required to be given by law or by these bylaws. He or she shall keep the seal of the corporation, if one be adopted, in safe custody and shall have such other powers and perform such other duties as may be prescribed by the board of directors or by these bylaws.

5.10 CHIEF FINANCIAL OFFICER

The chief financial officer shall keep and maintain, or cause to be kept and maintained, adequate and correct books and records of accounts of the properties and business transactions of the corporation, including accounts of its assets, liabilities, receipts, disbursements, gains, losses, capital, retained earnings and shares. The books of account shall at all reasonable times be open to inspection by any director for a purpose reasonably related to his position as a director.

The chief financial officer shall deposit all money and other valuables in the name and to the credit of the corporation with such depositaries as may be designated by the board of directors. He or she shall disburse the funds of the corporation as may be ordered by the board of directors, shall render to the president and directors, whenever they request it, an account of all of his or her transactions as chief financial officer and of the financial condition of the corporation, and shall have such other powers and perform such other duties as may be prescribed by the board of directors or these bylaws.

5.11 ASSISTANT SECRETARY

The assistant secretary, if any, or, if there is more than one, the assistant secretaries in the order determined by the board of directors (or if there be no such determination, then in the order of their election) shall, in the absence of the secretary or in the event of his or her inability or refusal to act, perform the duties and exercise the powers of the secretary and shall perform such other duties and have such other powers as the board of directors may from time to time prescribe.

5.12 ADMINISTRATIVE OFFICERS

In addition to the Corporate Officers of the corporation as provided in Section 5.1 of these bylaws and such subordinate Corporate Officers as may be appointed in accordance with Section 5.3 of these bylaws, there may also be such Administrative Officers of the corporation as may be designated and appointed from time to time by the president of the corporation. Administrative Officers shall perform such duties and have such powers as from time to time may be determined by the president or the board of directors in order to assist the Corporate Officers in the furtherance of their duties. In the performance of such duties and the exercise of such powers, however, such Administrative Officers shall have limited authority to act on behalf of the corporation as the board of directors shall establish, including but not limited to limitations on the dollar amount and on the scope of agreements or commitments that may be made by such Administrative Officers on behalf of the corporation, which limitations may not be exceeded by such individuals or altered by the president without further approval by the board of directors.

5.13 AUTHORITY AND DUTIES OF OFFICERS

In addition to the foregoing powers, authority and duties, all officers of the corporation shall respectively have such authority and powers and perform such duties in the management of the business of the corporation as may be designated from time to time by the board of directors.

ARTICLE VI

INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES AND OTHER AGENTS

6.1 INDEMNIFICATION OF DIRECTORS AND OFFICERS

The corporation shall, to the maximum extent and in the manner permitted by the General Corporation Law of Delaware as the same now exists or may hereafter be amended, indemnify any person against expenses (including attorneys' fees), judgments, fines, and amounts paid in settlement actually and reasonably incurred in connection with any threatened, pending or completed action, suit, or proceeding in which such person was or is a party or is threatened to be made a party by reason of the fact that such person is or was a director or officer of the corporation. For purposes of this Section 6.1, a "director" or "officer" of the corporation shall mean any person (i) who is or was a director or officer of the corporation, (ii) who is or was serving at the request of the corporation as a director or officer of another corporation, partnership, joint venture, trust or other enterprise or (iii) who was a director or officer of a corporation which was a predecessor corporation of the corporation or of another enterprise at the request of such predecessor corporation.

The corporation shall be required to indemnify a director or officer in connection with an action, suit, or proceeding (or part thereof) initiated by such director or officer only if the initiation of such action, suit, or proceeding (or part thereof) by the director or officer was authorized by the board of Directors of the corporation.

The corporation shall pay the expenses (including attorney's fees) incurred by a director or officer of the corporation entitled to indemnification hereunder in defending any action, suit or proceeding referred to in this Section 6.1 in advance of its final disposition; provided, however, that payment of expenses incurred by a director or officer of the corporation in advance of the final disposition of such action, suit or proceeding shall be made only upon receipt of an undertaking by the director or officer to repay all amounts advanced if it should ultimately be determined that the director or officer is not entitled to be indemnified under this Section 6.1 or otherwise.

The rights conferred on any person by this Article shall not be exclusive of any other rights which such person may have or hereafter acquire under any statute, provision of the corporation's certificate of incorporation, these bylaws, agreement, vote of the stockholders or disinterested directors or otherwise.

Any repeal or modification of the foregoing provisions of this Article shall not adversely affect any right or protection hereunder of any person in respect of any act or omission occurring prior to the time of such repeal or modification.

6.2 INDEMNIFICATION OF OTHERS

The corporation shall have the power, to the maximum extent and in the manner permitted by the General Corporation Law of Delaware as the same now exists or may hereafter be amended, to indemnify any person (other than directors and officers) against expenses (including attorneys' fees), judgments, fines, and amounts paid in settlement actually and reasonably incurred in connection with any threatened, pending or completed action, suit, or proceeding, in which such person was or is a party or is threatened to be made a party by reason of the fact that such person is or was an employee or agent of the corporation. For purposes of this Section 6.2, an "employee" or "agent" of the corporation (other than a director or officer) shall mean any person (i) who is or was an employee or agent of the corporation, (ii) who is or was serving at the request of the corporation as an employee or agent of another corporation, partnership, joint venture, trust or other enterprise or (iii) who was an employee or agent of a corporation which was a predecessor corporation of the corporation or of another enterprise at the request of such predecessor corporation.

6.3 INSURANCE

The corporation may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against him or her and incurred by him or her in any such capacity, or arising out of his or her status as such, whether or not the corporation would have the power to indemnify him or her against such liability under the provisions of the General Corporation Law of Delaware.

ARTICLE VII

RECORDS AND REPORTS

7.1 MAINTENANCE AND INSPECTION OF RECORDS

The corporation shall, either at its principal executive office or at such place or places as designated by the board of directors, keep a record of its stockholders listing their names and addresses and the number and class of shares held by each stockholder, a copy of these bylaws as amended to date, accounting books and other records of its business and properties.

Any stockholder of record, in person or by attorney or other agent, shall, upon written demand under oath stating the purpose thereof, have the right during the usual hours for business to inspect for any proper purpose the corporation's stock ledger, a list of its stockholders, and its other books and records and to make copies or extracts therefrom. A proper purpose shall mean a purpose reasonably related to such person's interest as a stockholder. In every instance where an attorney or other agent is the person who seeks the right to inspection, the demand under oath shall be accompanied by a power of attorney or such other writing that authorizes the attorney or other agent to so act on behalf of the stockholder. The demand under oath shall be directed to the corporation at its registered office in Delaware or at its principal place of business.

7.2 INSPECTION BY DIRECTORS

Any director shall have the right to examine the corporation's stock ledger, a list of its stockholders and its other books and records for a purpose reasonably related to his or her position as a director.

7.3 ANNUAL STATEMENT TO STOCKHOLDERS

The board of directors shall present at each annual meeting, and at any special meeting of the stockholders when called for by vote of the stockholders, a full and clear statement of the business and condition of the corporation.

7.4 REPRESENTATION OF SHARES OF OTHER CORPORATIONS

The chairman of the board, if any, the president, any vice president, the chief financial officer, the secretary or any assistant secretary of this corporation, or any other person authorized by the board of directors or the president or a vice president, is authorized to vote, represent and exercise on behalf of this corporation all rights incident to any and all shares of the stock of any other corporation or corporations standing in the name of this corporation. The authority herein granted may be exercised either by such person directly or by any other person authorized to do so by proxy or power of attorney duly executed by such person having the authority.

7.5 CERTIFICATION AND INSPECTION OF BYLAWS

The original or a copy of these bylaws, as amended or otherwise altered to date, certified by the secretary, shall be kept at the corporation's principal executive office and shall be open to inspection by the stockholders of the corporation, at all reasonable times during office hours.

ARTICLE VIII

GENERAL MATTERS

8.1 RECORD DATE FOR PURPOSES OTHER THAN NOTICE AND VOTING

For purposes of determining the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action, the board of directors may fix, in advance, a record date, which shall not precede the date upon which the resolution fixing the record date is adopted and which shall not be more than sixty (60) days before any such action. In that case, only stockholders of record at the close of business on the date so fixed are entitled to receive the dividend, distribution or allotment of rights, or to exercise such rights, as the case may be, notwithstanding any transfer of any shares on the books of the corporation after the record date so fixed, except as otherwise provided by law.

If the board of directors does not so fix a record date, then the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the board of directors adopts the applicable resolution.

8.2 CHECKS; DRAFTS; EVIDENCES OF INDEBTEDNESS

From time to time, the board of directors shall determine by resolution which person or persons may sign or endorse all checks, drafts, other orders for payment of money, notes or other evidences of indebtedness that are issued in the name of or payable to the corporation, and only the persons so authorized shall sign or endorse those instruments.

8.3 CORPORATE CONTRACTS AND INSTRUMENTS: HOW EXECUTED

The board of directors, except as otherwise provided in these bylaws, may authorize and empower any officer or officers, or agent or agents, to enter into any contract or execute any instrument in the name of and on behalf of the corporation; such power and authority may be general or confined to specific instances. Unless so authorized or ratified by the board of directors or within the agency power of an officer, no officer, agent or employee shall have any power or authority to bind the corporation by any contract or engagement or to pledge its credit or to render it liable for any purpose or for any amount.

8.4 STOCK CERTIFICATES; TRANSFER; PARTLY PAID SHARES

The shares of the corporation shall be represented by certificates, provided that the board of directors of the corporation may provide by resolution or resolutions that some or all of any or all classes or series of its stock shall be uncertificated shares. Any such resolution shall not apply to shares represented by a certificate until such certificate is surrendered to the corporation. Notwithstanding the adoption of such a resolution by the board of directors, every holder of stock represented by certificates and, upon request, every holder of uncertificated shares, shall be entitled to have a certificate signed by, or in the name of the corporation by, the chairman or vice-chairman of the board of directors, or the president or vice-president, and by the treasurer or an assistant treasurer, or the secretary or an assistant secretary of such corporation representing the number of shares registered in certificate form. Any or all of the signatures on the certificate may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate has ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the corporation with the same effect as if he or she were such officer, transfer agent or registrar at the date of issue.

Certificates for shares shall be of such form and device as the board of directors may designate and shall state the name of the record holder of the shares represented thereby; its number; date of issuance; the number of shares for which it is issued; a summary statement or reference to the powers, designations, preferences or other special rights of such stock and the qualifications, limitations or restrictions of such preferences and/or rights, if any; a statement or summary of liens, if any; a conspicuous notice of restrictions upon transfer or registration of transfer, if any; a statement as to any applicable voting trust agreement; if the shares be assessable, or, if assessments are collectible by personal action, a plain statement of such facts.

Upon surrender to the secretary or transfer agent of the corporation of a certificate for shares duly endorsed or accompanied by proper evidence of succession, assignment or authority to transfer, it shall be the duty of the corporation to issue a new certificate to the person entitled thereto, cancel the old certificate and record the transaction upon its books.

The corporation may issue the whole or any part of its shares as partly paid and subject to call for the remainder of the consideration to be paid therefor. Upon the face or back of each stock certificate issued to represent any such partly paid shares, or upon the books and records of the corporation in the case of uncertificated partly paid shares, the total amount of the consideration to be paid therefor and the amount paid thereon shall be stated. Upon the declaration of any dividend on fully paid shares, the corporation shall declare a dividend upon partly paid shares of the same class, but only upon the basis of the percentage of the consideration actually paid thereon.

8.5 SPECIAL DESIGNATION ON CERTIFICATES

If the corporation is authorized to issue more than one class of stock or more than one series of any class, then the powers, the designations, the preferences and the relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of the certificate that the corporation shall issue to represent such class or series of stock; provided, however, that, except as otherwise provided in Section 202 of the General Corporation Law of Delaware, in lieu of the foregoing requirements there may be set forth on the face or back of the certificate that the corporation shall issue to represent such class or series of stock a statement that the corporation will furnish without charge to each stockholder who so requests the powers, the designations, the preferences and the relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

8.6 LOST CERTIFICATES

Except as provided in this Section 8.6, no new certificates for shares shall be issued to replace a previously issued certificate unless the latter is surrendered to the corporation and cancelled at the same time. The board of directors may, in case any share certificate or certificate for any other security is lost, stolen or destroyed, authorize the issuance of replacement certificates on such terms and conditions as the board may require; the board may require indemnification of the corporation secured by a bond or other adequate security sufficient to protect the corporation against any claim that may be made against it, including any expense or liability, on account of the alleged loss, theft or destruction of the certificate or the issuance of the replacement certificate.

8.7 TRANSFER AGENTS AND REGISTRARS

The board of directors may appoint one or more transfer agents or transfer clerks, and one or more registrars, each of which shall be an incorporated bank or trust company — either domestic or foreign, who shall be appointed at such times and places as the requirements of the corporation may necessitate and the board of directors may designate.

8.8 CONSTRUCTION; DEFINITIONS

Unless the context requires otherwise, the general provisions, rules of construction and definitions in the General Corporation Law of Delaware shall govern the construction of these bylaws. Without limiting the generality of this provision, as used in these bylaws, the singular number includes the plural, the plural number includes the singular, and the term “person” includes both an entity and a natural person.

ARTICLE IX

AMENDMENTS

The original or other bylaws of the corporation may be adopted, amended or repealed by the stockholders entitled to vote; provided, however, that the corporation may, in its certificate of incorporation, confer the power to adopt, amend or repeal bylaws upon the directors. The fact that such power has been so conferred upon the directors shall not divest the stockholders of the power, nor limit their power to adopt, amend or repeal bylaws.

Whenever an amendment or new bylaw is adopted, it shall be copied in the book of bylaws with the original bylaws, in the appropriate place. If any bylaw is repealed, the fact of repeal with the date of the meeting at which the repeal was enacted or the filing of the operative written consent(s) shall be stated in said book.

ARTICLE X

DISSOLUTION

If it should be deemed advisable in the judgment of the board of directors of the corporation that the corporation should be dissolved, the board, after the adoption of a resolution to that effect by a majority of the whole board at any meeting called for that purpose, shall cause notice to be mailed to each stockholder entitled to vote thereon of the adoption of the resolution and of a meeting of stockholders to take action upon the resolution.

At the meeting a vote shall be taken for and against the proposed dissolution. If a majority of the outstanding stock of the corporation entitled to vote thereon votes for the proposed dissolution, then a certificate stating that the dissolution has been authorized in accordance with the provisions of Section 275 of the General Corporation Law of Delaware and setting forth the names and residences of the directors and officers shall be executed, acknowledged, and filed and shall become effective in accordance with Section 103 of the General Corporation Law of Delaware. Upon such certificate's becoming effective in accordance with Section 103 of the General Corporation Law of Delaware, the corporation shall be dissolved.

Whenever all the stockholders entitled to vote on a dissolution consent in writing, either in person or by duly authorized attorney, to a dissolution, no meeting of directors or stockholders shall be necessary. The consent shall be filed and shall become effective in accordance with Section 103 of the General Corporation Law of Delaware. Upon such consent's becoming effective in accordance with Section 103 of the General Corporation Law of Delaware, the corporation shall be dissolved. If the consent is signed by an attorney, then the original power of attorney or a photocopy thereof shall be attached to and filed with the consent. The consent filed with the Secretary of State shall have attached to it the affidavit of the secretary or some other officer of the corporation stating that the consent has been signed by or on behalf of all the stockholders entitled to vote on a dissolution; in addition, there shall be attached to the consent a certification by the secretary or some other officer of the corporation setting forth the names and residences of the directors and officers of the corporation.

ARTICLE XI

CUSTODIAN

11.1 APPOINTMENT OF A CUSTODIAN IN CERTAIN CASES

The Court of Chancery, upon application of any stockholder, may appoint one or more persons to be custodians and, if the corporation is insolvent, to be receivers, of and for the corporation when:

- (i) at any meeting held for the election of directors the stockholders are so divided that they have failed to elect successors to directors whose terms have expired or would have expired upon qualification of their successors; or
- (ii) the business of the corporation is suffering or is threatened with irreparable injury because the directors are so divided respecting the management of the affairs of the corporation that the required vote for action by the board of directors cannot be obtained and the stockholders are unable to terminate this division; or
- (iii) the corporation has abandoned its business and has failed within a reasonable time to take steps to dissolve, liquidate or distribute its assets.

11.2 DUTIES OF CUSTODIAN

The custodian shall have all the powers and title of a receiver appointed under Section 291 of the General Corporation Law of Delaware, but the authority of the custodian shall be to continue the business of the corporation and not to liquidate its affairs and distribute its assets, except when the Court of Chancery otherwise orders and except in cases arising under Sections 226(a)(3) or 352(a)(2) of the General Corporation Law of Delaware.

HARMONIC INC.

CERTIFICATE OF AMENDMENT OF BYLAWS

The undersigned hereby certifies that he or she is the duly elected, qualified, and acting Secretary or Assistant Secretary of Harmonic Inc., a Delaware corporation, and that the foregoing bylaws were amended and restated on August 12, 2022 by the corporation's board of directors.

IN WITNESS WHEREOF, the undersigned has hereunto set his or her hand this 12th day of August, 2022.

/s/ Timothy C. Chu
Secretary

HARMONIC INC.
2002 DIRECTOR STOCK PLAN
RESTRICTED STOCK UNIT AGREEMENT

Unless otherwise defined herein, the terms defined in the Harmonic Inc. 2002 Director Stock Plan, as amended (the “Plan”), will have the same defined meanings in this Restricted Stock Unit Agreement (the “Agreement”).

NOTICE OF RESTRICTED STOCK UNIT GRANT

Grantee Name:

Address:

You have been granted the right to receive an award of Restricted Stock Units, subject to the terms and conditions of the Plan and this Agreement, as follows:

Grant Number

Date of Grant

Vesting Commencement Date

Number of Restricted Stock Units

Vesting Schedule:

Subject to any acceleration provisions contained in the Plan or set forth below, the Restricted Stock Units will vest in accordance with the following schedule:

One-hundred percent (100%) of the Restricted Stock Units shall vest on _____, subject to Grantee’s continuous status as a Director through such date.

In the event Grantee ceases to be a Director for any or no reason before Grantee vests in the Restricted Stock Units, the Restricted Stock Units and Grantee’s right to acquire any Shares hereunder will immediately terminate.

By Grantee's signature and the signature of the representative of Harmonic Inc. (the "Company") below, Grantee and the Company agree that this award of Restricted Stock Units is granted under and governed by the terms and conditions of the Plan and this Agreement, including the Terms and Conditions of Restricted Stock Unit Grant, attached hereto as Exhibit A, all of which are made a part of this document. Grantee has reviewed the Plan and this Agreement in their entirety, has had an opportunity to obtain the advice of counsel prior to executing this Agreement and fully understands all provisions of the Plan and Agreement. Grantee hereby agrees to accept as binding, conclusive and final all decisions or interpretations of the Board upon any questions relating to the Plan and Agreement. Grantee further agrees to notify the Company upon any change in the residence address indicated below.

GRANTEE:

HARMONIC INC.:

 Signature

 By

 Print Name

 Title
Residence Address:

EXHIBIT A**TERMS AND CONDITIONS OF RESTRICTED STOCK UNIT GRANT**

1. **Grant.** The Company hereby grants to the Grantee named in the Notice of Restricted Stock Unit Grant attached to this Agreement (“Grantee”) under the Plan an award of Restricted Stock Units, subject to all of the terms and conditions in this Agreement and the Plan, which is incorporated herein by reference. Subject to Section 11(a) of the Plan, in the event of a conflict between the terms and conditions of the Plan and the terms and conditions of this Agreement, the terms and conditions of the Plan will prevail.

2. **Company’s Obligation to Pay.** Each Restricted Stock Unit represents the right to receive a Share on the date it vests (or at such later time indicated in this Agreement). Unless and until the Restricted Stock Units will have vested in the manner set forth in Section 3 or Section 4 of this Agreement or Section 10(c) of the Plan, Grantee will have no right to payment of any such Restricted Stock Units. Prior to actual payment of any vested Restricted Stock Units, such Restricted Stock Units will represent an unsecured obligation of the Company, payable (if at all) only from the general assets of the Company. Any Restricted Stock Units that vest in accordance with this Agreement will be paid to Grantee (or in the event of Grantee’s death, to his or her properly designated beneficiary or estate) in whole Shares, subject to Grantee satisfying any applicable tax withholding obligations as set forth in Section 7. Subject to the provisions of Section 4, such vested Restricted Stock Units will be paid in Shares as soon as practicable after vesting, but in each such case within the period ending no later than the date that is two and one-half (2½) months from the end of the Company’s tax year that includes the vesting date.

3. **Vesting Schedule.** Except as provided in Section 4 of the Agreement and Section 10(c) of the Plan, and subject to Section 5, the Restricted Stock Units awarded by this Agreement will vest in accordance with the vesting provisions set forth in the Notice of Restricted Stock Unit Grant attached to this Agreement. Restricted Stock Units scheduled to vest on a certain date or upon the occurrence of a certain condition will not vest in Grantee in accordance with any of the provisions of this Agreement, unless Grantee will have been continuously a Director from the Date of Grant until the date such vesting occurs.

4. **Board Discretion.** The Board, in its discretion, may accelerate the vesting of the balance, or some lesser portion of the balance, of the unvested Restricted Stock Units at any time, subject to the terms of the Plan. If so accelerated, such Restricted Stock Units will be considered as having vested as of the date specified by the Board. Subject to the provisions of this Section 4 and Section 5, if the Board, in its discretion, accelerates the vesting of the balance, or some lesser portion of the balance, of the Restricted Stock Units, the payment of such accelerated Restricted Stock Units shall be made within the period ending no later than the date that is two and one-half months (2½) months from the end of the Company’s taxable year that includes the vesting date.

5. Forfeiture upon Termination of Continuous Status as a Director. Notwithstanding any contrary provision of this Agreement, the balance of the Restricted Stock Units that have not vested as of the time of Grantee's termination as a Director for any or no reason and Grantee's right to acquire any Shares hereunder will immediately terminate.

6. Death of Grantee. Any distribution or delivery to be made to Grantee under this Agreement will, if Grantee is then deceased, be made to Grantee's designated beneficiary, or if no beneficiary survives Grantee, the administrator or executor of Grantee's estate. Any such transferee must furnish the Company with (a) written notice of his or her status as transferee, and (b) evidence satisfactory to the Company to establish the validity of the transfer and compliance with any laws or regulations pertaining to said transfer.

7. Withholding of Taxes. Notwithstanding any contrary provision of this Agreement, no certificate representing the Shares will be issued to Grantee, unless and until satisfactory arrangements (as determined by the Board) will have been made by Grantee with respect to the payment of income, employment and other taxes which the Company determines must be withheld with respect to such Shares. The Board, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit Grantee to satisfy such tax withholding obligation, in whole or in part (without limitation) by (a) paying cash, (b) electing to have the Company withhold otherwise deliverable Shares having a Fair Market Value equal to the minimum amount required to be withheld, (c) delivering to the Company already vested and owned Shares having a Fair Market Value equal to the amount required to be withheld, or (d) selling a sufficient number of such Shares otherwise deliverable to Grantee through such means as the Company may determine in its sole discretion (whether through a broker or otherwise) equal to the amount required to be withheld. To the extent determined appropriate by the Company in its discretion, it will have the right (but not the obligation) to satisfy any tax withholding obligations by reducing the number of Shares otherwise deliverable to Grantee. If Grantee fails to make satisfactory arrangements for the payment of any required tax withholding obligations hereunder at the time any applicable Restricted Stock Units otherwise are scheduled to vest pursuant to Sections 3 or 4, Grantee will permanently forfeit such Restricted Stock Units and any right to receive Shares thereunder and the Restricted Stock Units will be returned to the Company at no cost to the Company.

8. Rights as Stockholder. Neither Grantee nor any person claiming under or through Grantee will have any of the rights or privileges of a stockholder of the Company in respect of any Shares deliverable hereunder unless and until certificates representing such Shares will have been issued, recorded on the records of the Company or its transfer agents or registrars, and delivered to Grantee. After such issuance, recordation and delivery, Grantee will have all the rights of a stockholder of the Company with respect to voting such Shares and receipt of dividends and distributions on such Shares.

9. No Guarantee of Continued Service. GRANTEE ACKNOWLEDGES AND AGREES THAT THE VESTING OF THE RESTRICTED STOCK UNITS PURSUANT TO THE VESTING SCHEDULE HEREOF IS EARNED ONLY BY CONTINUING AS A DIRECTOR AT THE WILL OF THE COMPANY AND NOT THROUGH THE ACT OF BEING HIRED, BEING GRANTED THIS AWARD OF RESTRICTED STOCK UNITS OR ACQUIRING SHARES HEREUNDER. GRANTEE FURTHER ACKNOWLEDGES AND AGREES THAT THIS AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREUNDER AND THE VESTING SCHEDULE SET FORTH HEREIN DO NOT CONSTITUTE AN EXPRESS OR IMPLIED PROMISE OF CONTINUED ENGAGEMENT AS A DIRECTOR FOR THE VESTING PERIOD, FOR ANY PERIOD, OR AT ALL, AND WILL NOT INTERFERE IN ANY WAY WITH GRANTEE'S RIGHT OR THE RIGHT OF THE COMPANY TO TERMINATE GRANTEE'S RELATIONSHIP AS A DIRECTOR AT ANY TIME, WITH OR WITHOUT CAUSE.

10. Address for Notices. Any notice to be given to the Company under the terms of this Agreement will be addressed to the Company, in care of its General Counsel at Harmonic Inc., 2590 Orchard Parkway, San Jose, CA 95131, or at such other address as the Company may hereafter designate in writing.

11. Grant is Not Transferable. Except to the limited extent provided in Section 6, this grant and the rights and privileges conferred hereby will not be transferred, assigned, pledged or hypothecated in any way (whether by operation of law or otherwise) and will not be subject to sale under execution, attachment or similar process. Upon any attempt to transfer, assign, pledge, hypothecate or otherwise dispose of this grant, or any right or privilege conferred hereby, or upon any attempted sale under any execution, attachment or similar process, this grant and the rights and privileges conferred hereby immediately will become null and void.

12. Binding Agreement. Subject to the limitation on the transferability of this grant contained herein, this Agreement will be binding upon and inure to the benefit of the heirs, legatees, legal representatives, successors and assigns of the parties hereto.

13. Additional Conditions to Issuance of Stock. If at any time the Company will determine, in its discretion, that the listing, registration or qualification of the Shares upon any securities exchange or under any state or federal law, or the consent or approval of any governmental regulatory authority is necessary or desirable as a condition to the issuance of Shares to Grantee (or his or her estate), such issuance will not occur unless and until such listing, registration, qualification, consent or approval will have been effected or obtained free of any conditions not acceptable to the Company. Where the Company determines that the delivery of the payment of any Shares will violate federal securities laws or other applicable laws, the Company will defer delivery until the earliest date at which the Company reasonably anticipates that the delivery of Shares will no longer cause such violation. The Company will make all reasonable efforts to meet the requirements of any such state or federal law or securities exchange and to obtain any such consent or approval of any such governmental authority.

14. Plan Governs. This Agreement is subject to all terms and provisions of the Plan. In the event of a conflict between one or more provisions of this Agreement and one or more provisions of the Plan, the provisions of the Plan will govern. Capitalized terms used and not defined in this Agreement will have the meaning set forth in the Plan.

15. Board Authority. The Board will have the power to interpret the Plan and this Agreement and to adopt such rules for the administration, interpretation and application of the Plan as are consistent therewith and to interpret or revoke any such rules (including, but not limited to, the determination of whether or not any Restricted Stock Units have vested). All actions taken and all interpretations and determinations made by the Board in good faith will be final and binding upon Grantee, the Company and all other interested persons. No member of the Board will be personally liable for any action, determination or interpretation made in good faith with respect to the Plan or this Agreement.

16. Electronic Delivery. The Company may, in its sole discretion, decide to deliver any documents related to Restricted Stock Units awarded under the Plan or future Restricted Stock Units that may be awarded under the Plan by electronic means or request Grantee's consent to participate in the Plan by electronic means. Grantee hereby consents to receive such documents by electronic delivery and agrees to participate in the Plan through any on-line or electronic system established and maintained by the Company or another third party designated by the Company.

17. Captions. Captions provided herein are for convenience only and are not to serve as a basis for interpretation or construction of this Agreement.

18. Agreement Severable. In the event that any provision in this Agreement will be held invalid or unenforceable, such provision will be severable from, and such invalidity or unenforceability will not be construed to have any effect on, the remaining provisions of this Agreement.

19. Modifications to the Agreement. This Agreement constitutes the entire understanding of the parties on the subjects covered. Grantee expressly warrants that he or she is not accepting this Agreement in reliance on any promises, representations, or inducements other than those contained herein. Modifications to this Agreement or the Plan can be made only in an express written contract executed by a duly authorized officer of the Company. Notwithstanding anything to the contrary in the Plan or this Agreement, the Company reserves the right to revise this Agreement as it deems necessary or advisable, in its sole discretion and without the consent of Grantee, to comply with Section 409A or to otherwise avoid imposition of any additional tax or income recognition under Section 409A in connection to this award of Restricted Stock Units.

20. Amendment, Suspension or Termination of the Plan. By accepting this award of Restricted Stock Units, Grantee expressly warrants that he or she has received an award of Restricted Stock Units under the Plan, and has received, read and understood a description of the Plan. Grantee understands that the Plan is discretionary in nature and may be amended, suspended or terminated by the Company at any time.

21. Governing Law. This Agreement will be governed by the laws of the State of California, without giving effect to the conflict of law principles thereof. For purposes of litigating any dispute that arises under this award of Restricted Stock Units or this Agreement, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of Santa Clara County, California, or the federal courts for the United States for the Northern District of California, and no other courts, where this award of Restricted Stock Units is made and/or to be performed.

HARMONIC INC. AND SUBSIDIARIES
SUBSIDIARIES OF THE REGISTRANT

The following table lists the direct and indirect subsidiaries of Harmonic Inc. as of December 31, 2022:

Name	State or Other Jurisdiction of Incorporation or Organization
Harmonic Delaware, L.L.C.	U.S.A.
Harmonic Germany GmbH	Germany
Harmonic Japan GK	Japan
Harmonic India Private Limited	India
Harmonic International GmbH	Switzerland
Harmonic International Inc	U.S.A.
Harmonic Lightwaves (Israel) Ltd	Israel
Harmonic Singapore P.T.E. Ltd.	Singapore
Harmonic Spain SL	Spain
Harmonic Technologies (HK) Limited	Hong Kong
Harmonic (UK) Limited	United Kingdom
Harmonic Video Networks Ltd.	Israel
Horizon Acquisition Ltd	Israel
Harmonic Brasil LTDA	Brazil
Harmonic S.R.I.	Argentina
Harmonic Mexico International	Mexico
Harmonic Video Networks Malaysia Sdn Bhd	Malaysia
Harmonic International Australia Pty Ltd	Australia
Harmonic Italia Srl	Italy
Harmonic Technologies (Beijing) Co. Ltd	China
Financiere Kepler SAS	France
Harmonic France SAS	France
Thomson Video Networks India Private Ltd	India
Harmonic Technologies (Canada)	Canada

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements (Form S-8 Nos. 333-38025, 333-65051, 333-86649, 333-84720, 333-91464, 333-116467, 333-136425, 333-154715, 333-159877, 333-167197, 333-176211, 333-182931, 333-192089, 333-200032, 333-207866, 333-212242, 333-218902, 333-225874, 333-232431, 333-244390, 333-258980, and 333-267002) of Harmonic, Inc. of our reports dated February 28, 2023, with respect to the consolidated financial statements of Harmonic, Inc. and the effectiveness of internal control over financial reporting of Harmonic, Inc. included in this Annual Report (Form 10-K) of Harmonic, Inc. for the year ended December 31, 2022.

/s/ Ernst & Young LLP

San Jose, California
February 28, 2023

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-38025, 333-65051, 333-86649, 333-84720, 333-91464, 333-116467, 333-136425, 333-154715, 333-159877, 333-167197, 333-176211, 333-182931, 333-192089, 333-200032, 333-207866, 333-212242, 333-218902, 333-225874, 333-232431, 333-244390, 333-258980 and 333-267002) of our report dated March 2, 2021, relating to the consolidated financial statements of Harmonic Inc. (the "Company"), and the effectiveness of the Company's internal control over financial reporting, appearing in this Annual Report on Form 10-K for the year ended December 31, 2022.

/s/ Armanino LLP

Armanino LLP

San Ramon, California

February 28, 2023

HARMONIC INC.
CERTIFICATION

I, Patrick J. Harshman, certify that:

1. I have reviewed this Annual Report on Form 10-K of Harmonic Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2023

By: /s/ Patrick J. Harshman
Patrick J. Harshman
President and Chief Executive Officer
(Principal Executive Officer)

HARMONIC INC.**CERTIFICATION**

I, Sanjay Kalra, certify that:

1. I have reviewed this Annual Report on Form 10-K of Harmonic Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2023

By: /s/ Sanjay Kalra
Sanjay Kalra
Chief Financial Officer

HARMONIC INC.
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

As of the date hereof, I, Patrick J. Harshman, President and Chief Executive Officer of Harmonic Inc. (the “Company”), certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the annual report of the Company on Form 10-K for the fiscal year ended December 31, 2022, as filed with the Securities and Exchange Commission (the “Report”), fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company. This written statement is being furnished to the Securities and Exchange Commission as an exhibit accompanying such Report and shall not be deemed filed pursuant to the Securities Exchange Act of 1934, as amended.

Date: February 28, 2023

/s/ Patrick J. Harshman

Patrick J. Harshman
President and Chief Executive Officer

HARMONIC INC.
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

As of the date hereof, I, Sanjay Kalra, Chief Financial Officer of Harmonic Inc. (the “Company”), certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the annual report of the Company on Form 10-K for the fiscal year ended December 31, 2022, as filed with the Securities and Exchange Commission (the “Report”), fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company. This written statement is being furnished to the Securities and Exchange Commission as an exhibit accompanying such Report and shall not be deemed filed pursuant to the Securities Exchange Act of 1934, as amended.

Date: February 28, 2023

/s/ Sanjay Kalra

Sanjay Kalra
Chief Financial Officer

