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, 2021

OR

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

For the transition period from to

Commission file number 001-36467

RESONANT INC.

(Exact Name of Registrant as Specified in Its charter)

Delaware	**45-4320930**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

10900 Stonelake Blvd, Suite 100, Office 02-130, Austin, Texas 78759

(Address of Principal Executive Offices) (Zip Code)

(805) 308-9803

(Registrant's Telephone Number, Including Area Code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.001 par value	RESN	The NASDAQ Stock Market LLC

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

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

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

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act:

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

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

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

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

As of June 30, 2021, the aggregate market value of the voting and non-voting common equity held by non-affiliates was $89 million, based on the closing price on that date. As of March 14, 2022, the registrant had 67,186,080 shares of common stock issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

None

Auditor Name:	KPMG LLP	Auditor Location:	Irvine, California	Auditor Firm ID:	185

RESONANT INC.
FORM 10-K
TABLE OF CONTENTS

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. The words "believe," "may," "will," "potentially," "estimate," "continue," "anticipate," "intend," "could," "would," "project," "plan," "expect" and similar expressions that convey uncertainty of future events or outcomes are intended to identify forward-looking statements. These forward-looking statements include, but are not limited to, statements concerning the following:

- *our ability to fund our planned operations and implement our business plan;*
- *the status of filter designs under development;*
- *the prospects for licensing filter designs upon completion of development;*
- *plans for other filter designs not currently in development;*
- *potential customers for our designs;*
- *the timing and amount of future royalty streams;*
- *our plans regarding the use of proceeds from our financings and the expected duration of our capital resources;*
- *our plans regarding future financings;*
- *our hiring plans;*
- *the impact of our designs on the mobile device market;*
- *our business strategy;*
- *our intentions, expectations and beliefs regarding anticipated growth, market penetration and trends in our business;*
- *the timing and success of our plan of commercialization;*
- *our dependence on growth in our customers' businesses;*
- *our customers' success in marketing products incorporating our designs to their customers;*
- *the effects of market conditions on our stock price and operating results;*
- *our ability to maintain our competitive technological advantages against competitors in our industry and the related costs associated with defending intellectual property infringement and other claims;*
- *our ability to timely and effectively adapt our existing technology and have our technology solutions gain market acceptance;*
- *our ability to introduce new filter designs and bring them to market in a timely manner;*
- *our ability to maintain, protect and enhance our intellectual property;*
- *our expectations concerning our relationships with our customers and other third parties and our customers' relationships with their manufacturers and customers;*
- *the attraction and retention of qualified employees and key personnel;*
- *future acquisitions of or investments in complementary companies or technologies; and*
- *our ability to comply with evolving legal standards and regulations, particularly concerning requirements for being a public company and United States export regulations.*

These forward-looking statements speak only as of the date of this Form 10-K and are subject to uncertainties, assumptions and business and economic risks. As such, our actual results could differ materially from those set forth in the forward-looking statements as a result of the factors set forth below in Part I, Item 1A, "Risk Factors," and in our other reports filed with the Securities and Exchange Commission, or SEC. Moreover, we operate in a very competitive and rapidly changing

environment, and new risks emerge from time to time. It is not possible for us to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this Form 10-K may not occur, and actual results could differ materially and adversely from those anticipated or implied in our forward-looking statements.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in our forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances described in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this Form 10-K to conform these statements to actual results or to changes in our expectations, except as required by law.

You should read this Annual Report on Form 10-K and the documents that we reference in this Annual Report on Form 10-K and have filed with the SEC as exhibits thereto with the understanding that our actual future results and circumstances may be materially different from what we expect.

PART I

ITEM 1. BUSINESS

Overview

Resonant is a late-stage development company that has created an innovative software, intellectual property, or IP, and services platform that has the ability to increase designer efficiency, reduce the time to market and lower unit costs in the designs of filters for radio frequency, or RF, front-ends for the mobile device, automotive, medical, internet-of-things and related industries. The RF front-end, or RFFE, is the circuitry in a device responsible for analog signal processing and is located between the device's antenna and its digital circuitry. The software platform we continue to develop is based on fundamentally new technology that we call WaveX™, to configure and connect resonators, the building blocks of RF filters. Filters are a critical component of the RF front-end used to select desired radio frequency signals and reject unwanted signals. Our WaveX™ platform allows us to develop unique, custom designs that address the increasing complexity of the RFFE due to increasing bandwidth requirements, such as by using carrier aggregation (the combining of multiple frequencies into a single data stream to increase throughput through higher data rates), or CA, by both reducing the size of the filter and improving performance. Our goal is to utilize our WaveX™ platform to support our customers in reducing their time to develop complex filter and module designs, to access new classes of filter designs, and to do it more cost effectively. Additionally, our WaveX™ platform has allowed us to expand our customer focus beyond just filter manufacturers by enabling a new class of customer - fabless filter manufacturers. These companies do not have their own internal filter fabrication facility, or fab, and typically already would be supplying other products in the RFFE to the original equipment manufacturers (OEMs), and, as a result do not require a protracted new vendor qualification process in order to supply parts. Through our existing customer relationships, we are able to leverage our WaveX™ tools to deliver cutting edge filter designs to these fabless filter manufacturers.

We are commercializing our technology through the creation of filter designs that address the problems in the high growth RFFE industry created by the growing number of frequency bands in mobile and other RFFE enabled devices. The worldwide adoption of Long Term Evolution, or LTE, as the global standard, the transition to 5G, and the use of mobile devices to access the Internet, has resulted in massive proliferation of frequency bands which, when combined with CA for higher data rates and multiple input multiple output, or MIMO, has resulted in an ever-increasing number and complexity of filters in the RFFE. We have developed and continue to expand a series of single-band designs for frequency bands presently dominated by larger and more expensive bulk acoustic wave, or BAW, filters. We are also developing multiplexer filter designs for two or more bands to address the CA requirements of our customers. We are using our WaveX™ platform to efficiently integrate these designs into RF modules for our module customers. Currently, we are leveraging WaveX™ to develop these designs targeted for either the Surface Acoustic Wave (SAW) or Temperature Compensated, Surface Acoustic Wave (TC-SAW) manufacturing processes. In 2018 we further extended WaveX™ for BAW designs, which has resulted in our invention of a resonator structure based on a combination of interdigital transducer (IDT) and piezoelectric membrane, which we call XBAR®, which exhibits performance parameters suitable for 5G, WiFi, and UltraWideband (UWB) applications - high frequency operation, large bandwidth and high power reliability. Our success with XBAR® is dependent on our ability to develop high frequency filters utilizing these resonator structures that are successfully adopted by our targeted customers, which will be determined by our ability to show improved performance over competing products or significantly reduce the size and cost of their products.

We believe licensing our designs, either as prepaid royalties or royalties paid as products ship, is the most direct and effective means of validating our WaveX™ platform and IP to address this rapidly growing market. Our target customers make part or all of the RFFE. We intend to retain ownership of our designs, and we expect to be compensated through license fees and royalties based on sales of RFFE filters that incorporate our designs and leverage our WaveX™ platform.

Our customer engagement process typically begins with the execution of a License Agreement, or LA, for specific bands. Depending on the complexity of the design, we estimate that initial samples of products to OEMs, will occur typically within nine to thirty-six months following execution of a license agreement. Following these development cycles, designs are manufactured, qualified by our customers and sampled to OEM customers. Our customers can take from three to six months to qualify a design and then the OEMs can take an additional three to six months, or longer, to qualify a design as fit for use, reliable and ready for mass production. The point at which an OEM begins taking product from our customers in mass production is typically when royalty revenues would begin. Our customer agreements typically provide for upfront design fees and royalty payments for each unit sold using our filter designs and typically last for a minimum of two years, but may be renewed for a longer period. More recently our agreements have included pre-paid royalties, which can be fully paid-up for a design, or a partial pre-pay with subsequent royalties when the part begins shipping.

In 2017, in order to further facilitate our fabless filter program, and to provide manufacturing stability across the supply chain, we embarked on the creation of our Foundry Program. Foundries joining Resonant's program first complete a

foundry evaluation process to ensure alignment with our customers for filter performance, manufacturing quality and capacity, and business practices. Once the evaluation is completed, the foundry runs a characterization lot, used to create a foundry process design kit, after which we are ready to start designs for manufacture in the foundry. Packaging/Back-end vendors can also join the program by completing a back-end evaluation process to match their capabilities with foundry partners and our customers. Through this program we enable a secure supply chain for all our customers.

In 2019, we began development of Filter IP Standard Library designs to enable faster time to market for our customers. Further, the first Filter IP Library design was incorporated into Cadence Design Systems, Inc.'s AWR design suite, allowing module designers access to Resonant filter designs. At Mobile World Congress we showed the first 5G filter based upon XBAR® technology - an n79 filter. Subsequently, we accepted a $7.0 million investment and signed a commercial agreement for the development and license of filters for four bands based on XBAR® technology, with Murata Manufacturing Co.,Ltd. ("MMC"), the industry's largest provider of filters for the RFFE. The commercial agreement provides for our receipt of up to an aggregate of $9.0 million of contract consideration in the form of "pre-paid royalties" for the licensed designs and certain other intellectual property developed in the collaboration, payable in installments over a multi-year development period, with each installment conditioned upon our achievement of certain milestones and deliverables acceptable to our customer in its discretion. During 2020, we continued the development of filters under the commercial agreement, resulting in completion of the second milestone ahead of schedule in October 2020. This milestone is significant as it recognizes achieving predetermined target performance, packaging and initial reliability. Completion of the milestone also resulted in the second payment from this customer. In September 2021, we entered into Addendum 1 to the commercial agreement, which amends and supplements the agreement to provide for the development of XBAR®-based designs for up to four additional bands. For rights to these additional bands, the customer has agreed to pay us a $4.0 million non-refundable upfront payment and up to an aggregate of between $8.0 million and $36.0 million in prep-paid royalties and other fees, with the amount of the aggregate payments determined based on the complexity of the filter designs selected for development. In October 2021, we entered into the first statement of work under the amendment for a total of $7.0 million for the development of an additional band. We received a total of $11.5 million from MMC as of December 31, 2021. In accounting for this contract under ASC 606, we have determined the total contract consideration is to be recognized over time as the intellectual property is developed.

In 2021, we continued to develop XBAR®-based filters, both for the mobile market in collaboration with MMC, as well as for the non-mobile market. During the year we expanded our patent portfolio and ended the year with more than 415 issued and pending patents, with more than 265 patents protecting our XBAR® technology. In September 2021, we expanded our agreement with MMC for the design of up to four additional radio frequency bands. In October 2021, Resonant customers cumulatively surpassed the milestone of shipping 100 million RF filters designed with the Company's proprietary WaveX™ design platform.

We plan to continue to pursue filter design projects with existing and potential customers and other strategic partners. These types of arrangements offer complementary technology and market intelligence. In addition, we will continue to help develop a fabless filter eco-system to support the growth in filter volumes for our customers. We will continue to develop XBAR® technology for both mobile and non-mobile applications, including 5G, WiFi and Ultra-WideBand (UWB) applications, forming strategic partnerships with filter manufacturers and customers to bring the technology to market as quickly as possible. We intend to retain ownership of our technology, software, designs and related improvements. Our goal is to establish and leverage alliances with new and existing customers, who will help grow the market for our designs by integrating them with their own proprietary technology and products, or by using our software products for their own designs, thus combining their own particular strengths with ours to provide an extensive array of solutions.

Merger Agreement

On February 14, 2022, we entered into an Agreement and Plan of Merger (the “Merger Agreement”) by and among Resonant, Murata Electronics North America, Inc., a Texas corporation (“Murata”), and PJ Cosmos Acquisition Company, Inc., a Delaware corporation and wholly owned subsidiary of Murata (“Purchaser”). Murata is a wholly-owned subsidiary of MMC.

Pursuant to the terms and subject to the conditions set forth in the Merger Agreement, on February 28, 2022 Purchaser commenced a cash tender offer (the “Offer”) to purchase all of the outstanding shares of Resonant’s common stock, par value $0.001 per share (the “Shares”), at a purchase price of $4.50 per Share, net to the tendering stockholder in cash, without interest and less any required withholding taxes (the “Per Share Amount”). Upon successful completion of the Offer, and subject to the terms and conditions of the Merger Agreement, Purchaser will be merged with and into Resonant (the “Merger”), and Resonant will survive the Merger as a wholly-owned subsidiary of Murata. At the effective time of the Merger (the “Effective Time”), each outstanding Share (other than Shares held by (i) Resonant, Murata or their respective subsidiaries immediately prior to the Effective Time and (ii) stockholders of Resonant who have properly and validly perfected their statutory appraisal rights under the Delaware General Corporation Law (“DGCL”)) will automatically be converted into the right to receive the Per Share Amount on the terms and subject to the conditions set forth in the Merger Agreement.

The initial expiration date of the Offer is the time that is one minute following 11:59 p.m., New York City time, on March 25, 2022, subject to extension in certain circumstances as required or permitted by the Merger Agreement and applicable law. The Offer is subject to the satisfaction of customary conditions, including, among others, that (i) at least that number of Shares validly tendered and not withdrawn (other than Shares tendered by guaranteed delivery where actual delivery has not occurred), when added to any Shares already owned by Murata or any of its controlled subsidiaries, if any, equal a majority of the outstanding Shares as of immediately prior to the time at which Purchaser first accepts for payment the Shares tendered in the Offer, (ii) the expiration or termination of the applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and (iii) the other conditions set forth in Annex A to the Merger Agreement have been satisfied or waived.

The Merger Agreement contemplates that the Merger will be effected pursuant to Section 251(h) of the DGCL, which permits completion of the Merger upon the collective ownership by Murata, Purchaser and any other subsidiary of Murata of one share more than 50% of the number of Shares that are then issued and outstanding, and if the Merger is so effected pursuant to Section 251(h) of the DGCL, no stockholder vote will be required to consummate the Merger.

The Merger Agreement places limitations on Resonant's ability to engage in certain types of transactions without Murata's consent during the period between the signing of the Merger Agreement and the Effective Time. During this period, Resonant may not raise additional capital through the sale of securities or incur debt. Further, other than in transactions in the ordinary course of business or within specified dollar limits and certain other limited exceptions, Resonant generally may not acquire other businesses, make investments in other persons, or sell, lease, or encumber our assets.

The Merger Agreement contains certain termination rights for each of us and Murata. Among such rights, and subject to certain limitations, either Resonant or Murata may terminate the Merger Agreement if the Offer is not completed by June 14, 2022, which date may be extended to August 14, 2022 under certain circumstances. The Merger Agreement also provides that upon termination of the Merger Agreement under specified circumstances, we may be required to pay Murata a termination fee of $11.2 million or Murata may be required to pay us a termination fee of $15.0 million. In addition, upon termination of the Merger Agreement under specified circumstances, we may be required to reimburse Murata for up to $3.0 million of expenses. Any expenses we reimburses Murata would be offset against and reduce the amount of the termination fee otherwise payable by us to Murata.

Additional information about the Merger Agreement is set forth in our current report on Form 8-K filed with the SEC on February 14, 2022.

No statement in this Annual Report on Form 10-K is an offer to purchase or a solicitation of an offer to sell any shares of the common stock of Resonant or any other securities. Murata and Purchaser have filed a tender offer statement on Schedule TO with the United States Securities and Exchange Commission (the "SEC"), and Resonant has filed a Solicitation/Recommendation Statement on Schedule 14D-9 with the SEC. Any offers to purchase or solicitations of offers to sell may be made only pursuant to such tender offer statement. INVESTORS AND SECURITY HOLDERS ARE URGED TO READ BOTH THE TENDER OFFER STATEMENT (INCLUDING AN OFFER TO PURCHASE, A LETTER OF TRANSMITTAL AND RELATED DOCUMENTS) AND THE SOLICITATION / RECOMMENDATION STATEMENT REGARDING THE OFFER, BECAUSE THEY CONTAIN IMPORTANT INFORMATION. These materials will be made available to Resonant's stockholders at no expense to them. In addition, investors and security holders may obtain a free copy of such materials and other documents filed with the SEC at the website maintained by the SEC at www.sec.gov or by directing such requests to the Information Agent for the tender offer, which is named in the tender offer statement.

Our History

Our inception date is May 29, 2012. We commenced business on July 6, 2012 and completed our initial public offering, or IPO, on May 29, 2014.

In July 2016, we acquired GVR Trade S.A., or GVR, a Swiss-based company specializing in the consultation and design of SAW and BAW devices. GVR is a wholly-owned direct subsidiary of Resonant.

In the fourth quarter of 2020, we moved our corporate headquarters to Austin, Texas to facilitate greater access to a technical and highly skilled workforce, while we continue to maintain facilities in Goleta and San Mateo, California where today the majority of our engineering talent resides. Our principal executive offices are located at 10900 Stonelake Blvd., Suite 100, Office 02-120, Austin, Texas 78759, and our telephone number is 805-308-9803.

Industry Background

Glossary

The following is a glossary of useful terms:

- *4G*—4th Generation is a mobile communications standard intended to replace 3G, allowing wireless Internet access at a much higher speed.
- *5G*—5th Generation is a mobile communications standard and is the latest iteration of cellular technology, engineered to greatly increase the speed and responsiveness of wireless networks.
- *Band, channel or frequency band*—a designated range of radio wave frequencies used to communicate with a mobile device.
- *Bulk acoustic wave (BAW)*—an acoustic wave traveling through a material exhibiting elasticity.
- *Duplexer*—a bi-directional device that connects the antenna to the transmitter and receiver of a wireless device and simultaneously filters both the transmit signal and receive signal.
- *Carrier Aggregation (CA)*—the aggregation, or adding together, of multiple carriers (frequency bands) to meet the LTE-Advanced specification requirements, allowing for increased transmission bandwidth delivery of higher data rates, improved capacity and more efficient use of a carriers fragmented spectrum.
- *Filter*—a series of interconnected resonators designed to pass (or select) a desired radio frequency signal and block unwanted signals.
- *Resonator*—a device that naturally oscillates (or resonates) at specific frequencies. The oscillations in a resonator can be either electromagnetic or mechanical (including acoustic). Resonators are the building blocks for filters.
- *RF front-end (RFFE)*—the circuitry in a mobile device responsible for the analog signal processing which is located between the antenna and the digital baseband.
- *Surface acoustic wave (SAW)*—an acoustic wave traveling along the surface of a material exhibiting elasticity, with an amplitude that typically decays exponentially with depth into the substrate.
- *Temperature-Compensated SAW (TC-SAW)*—a SAW device which has additional material alterations to reduce its variation with changes in temperature.
- *WiFi*—a wireless networking technology that allows devices to interface to the Internet.
- *Ultra-wideband (UWB)*—a radio technology that uses very low energy signal for short-range, high-bandwidth communications over a large portion of the radio spectrum.

The Mobile Internet

The need for multiplexers, duplexers and other filters in the RFFE of mobile devices continues to grow rapidly due to rising consumer demand for always-on wireless broadband. Mobile devices such as smartphones and tablets are quickly becoming the primary means of accessing the Internet. According to Cisco, there were 8.8 billion wireless devices in 2018, predicted to grow to 13.1 billion by 2023. To accommodate the increase in data usage, Cisco also predicts that WiFi hotspots will increase from 169 million in 2018 to 628 million by 2023.

The exponential growth in mobile data traffic is testing the limits of existing wireless bandwidth. Carriers and regulators have responded by opening new RF spectrum, driving up the number of frequency bands in mobile devices, with many of the most recent allocations being at higher frequencies than in the past, and of much wider bandwidths, thus pushing mobile phone designers to make more efficient use of spectrum.

According to Navian Inc., the market for RFFE filters in mobile devices was 45.5 billion filters in 2019 and will grow to an estimated 72.0 billion filters by 2024.

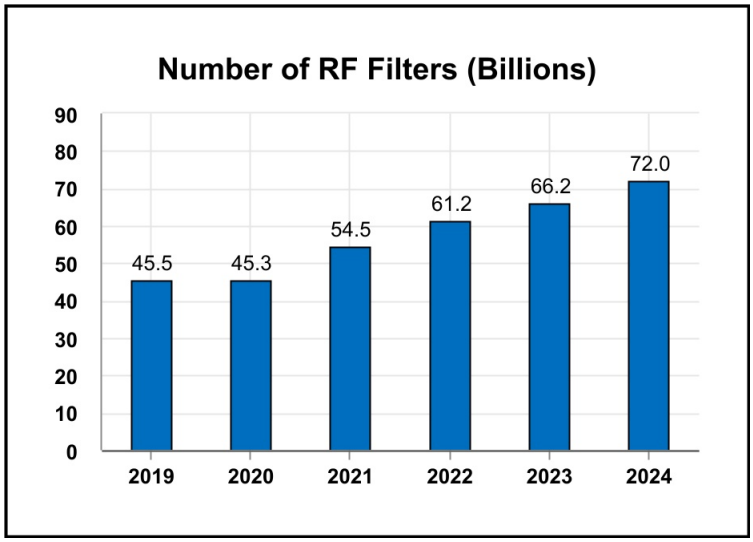

Figure 1—Projected growth of the market for RFFE filters including duplexers and multiplexers in mobile devices from 2019 through 2024 (in billions of filters). *Source: Navian Inc.*

In addition to RFFE filter unit growth, filter sales growth is expected to follow and was estimated to be $8.0 billion in 2019 and is forecasted to reach $12.2 billion by 2024, according to Navian.

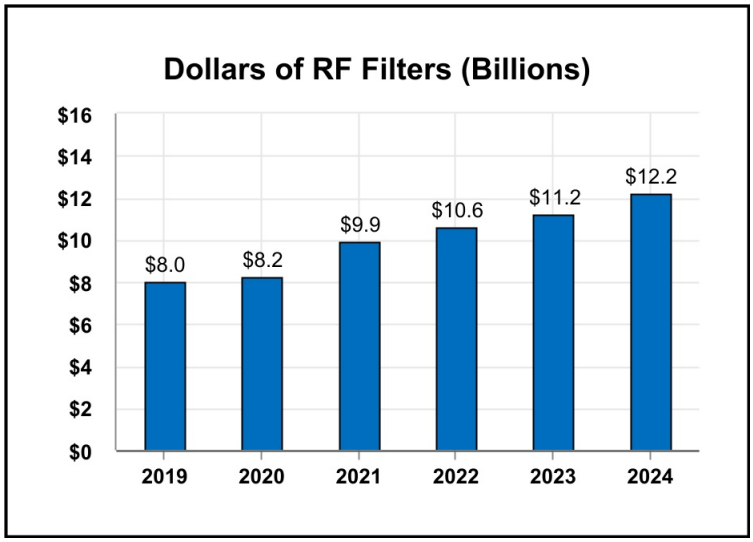

Figure 2—Projected growth of the market for RF front-end filters, including duplexers and multiplexers, in mobile devices from 2019 through 2024 (in billions of dollars). *Source: Navian Inc.*

Adding RF spectrum to increase capacity and data-rate is not a complete solution. The added spectrum for 4G does not come in large contiguous blocks, but rather in small channels or bands of varying size and frequency. Thus, more data means more bands, and the result is a rapid and substantial increase in the number of bands in mobile devices. 5G introduces new challenges for filter performance and complexity, by adding much larger blocks of spectrum at higher frequencies (above 3GHz).

Challenges Faced by the Mobile Device Industry

The world is progressing toward ubiquitous RF coverage in which almost all devices will be connected, most wirelessly. Technology experts predict that by 2023 there will be over 29.3 billion connected devices operating worldwide and we will be measuring mobile usage in Exabytes. This overwhelming demand for wireless data has driven the carriers and regulators to open new spectrum bands.

This substantial and rapid increase in bands has created several significant problems, including a corresponding increase in the number of filters and duplexers in mobile devices. Traditional RF front-end solutions typically require one duplexer for each frequency band. The iPhone 13, model A2481, supports coverage for 24 FDD-LTE and 8 TDD-LTE bands, in addition to support for previous wireless technology generations, 3G and 2G, and most recently 5G coverage for sub-6GHz and mmWave. Each band requires a filter, either as an individual filter, a duplexer or a multiplexer, depending upon the spectrum and CA requirements. This increase in number and complexity of filters is dramatically driving up the cost of RF front-ends. In the latest global smartphones, filters, duplexers and multiplexers comprise more than half of the cost to the RF front-end, according to Mobile Experts. The dramatic increase in the number of filters required, which includes Chip Scale Package, or CSP, Wafer Level Package, or WLP, filters, duplexers, multiplexers, with multiple sizes and multiple packaging substrates, each requiring a new design, requires an increase in design capacity, or improved design efficiency. WaveX™ improves the design efficiency by accurately modeling the performance of acoustic wave filters.

The growing number of filters is also increasing the total size of the RF front-end. In some cases, size constraints require the OEM to fragment its product offering into multiple versions, each with a limited set of filters customized for a particular geographic region. Multiple versions of a mobile product increases manufacturing, inventory and distribution costs. In addition, consumers can find it difficult to roam between carriers and/or countries due to this splintering of bands and phone models. Phone OEMs would prefer to make one version of a product containing a full set of filters that can be electronically selected as required for a particular carrier network.

In addition, the higher frequency 4G bands tend to use relatively expensive BAW technology. Phone OEMs would prefer to use SAW manufacturing processes because of its lower cost and smaller size. However, conventional filter designs using SAW technology do not perform adequately in high frequency bands or in bands with closely spaced receive and transmit channels, typical of many new bands. With the introduction of 5G, which uses even higher frequencies and wider bandwidths, this problem is further exacerbated.

Adding to the complexity of the industry, mobile devices must now be capable of receiving from two, to as many as five, downlink bands simultaneously, known as downlink CA. This CA requirement creates the need for complex multiplexing filters, or multiplexers, which are significantly more complex than duplexers and effectively require four filters for each CA combination. In addition, during the transition to 5G, dual connectivity to both 4G LTE and 5G New Radio (NR) networks is required. 3rd Generation Partnership Project has identified over 400 worldwide band combinations, creating increased complexity and cost to RFFEs. In the case of a quadplexer, with four different frequency bands, within each band the signal loss must be minimized, while rejecting three bands often in close proximity. Duplexers must only reject a single band. Mobile Experts predicts that more than 2 billion terminals will be shipped supporting CA in 2024. This rising complexity in the industry is also aggravating the constraints on design capacity and resources.

In addition to the challenges described above, 5G will further exacerbate the problems of more demand for filters, filter designs, and more complexity and integration in the RFFE. 5G comprises three distinct segments:

- Enhanced mobile broadband (eMBB): Increased bandwidth for extreme data-rates and capacity to support wireless video everywhere;
- Ultra Reliable Low Latency Communications (URLLC): High reliability, low latency and high security for automotive, health and government; and
- Massive Machine Type Communications (mMTC): Low cost, low energy, long life for wearables, smart home devices and interconnected devices.

All three of these segments require filters and will further accelerate the already substantial growth in the filter market.

Our Technology

RFFE module companies currently produce filters internally or purchase filters from third-party manufacturers, such as Broadcom, Murata, Taiyo-Yuden and Qualcomm. These module companies and filter manufacturers design filters using their

own internal resources, which we believe are proving insufficient to meet the explosive growth in both total global filter demand and unique filter designs, as well as the increasingly complex filter requirements necessitated in part by crowded spectrum and carrier aggregation. We believe that our patented WaveX™ technology will enable us to design complex filter products with shortened design times and help our customers benefit from the use of more cost-effective manufacturing processes. WaveX™ can be summarized as a two-step process:

We use circuit models to optimize initial designs. Most of the filter industry models acoustic wave filters using a coupling-of-modes, or COM, model. In contrast, we use circuit models derived from the actual physics of acoustic wave filters. Circuit models are computationally much faster, which allows for very quick optimization of the many possible solutions that result from the synthesis process. We can quickly compare large numbers of different, optimized solutions before commencing the third step - lengthy but highly accurate simulations based on fundamental methods.

We use fundamental models to simulate final designs. Our highly accurate models are based entirely on fundamental material properties and dimensions, again unlike the common practice in the industry today. The precision and accuracy of our models allows for far fewer turns through the fab to reach the desired product performance. Because our models are fundamental, integration with our foundry and fab customers is eased due to the understanding of the basic material properties and dimensions of the fab.

Using our WaveX™ design platform, in 2018 we invented a new resonator technology, XBAR®, with fundamental properties matching the new wireless requirements of higher frequency, wider bandwidth and higher power operation, when compared to previous wireless generations. At Mobile World Congress in 2019 we demonstrated a 5G (n79) filter prototype with the required bandwidth to support 5G operation across the entire band. XBAR® technology is applicable to many current and projected wireless technologies which operate above 3GHz. Hence we are developing designs for both mobile and non-mobile applications for 5G and WiFi, and fully expect to extend this to UWB and 6G. In addition to the fundamental advantages of XBAR®, the straightforward processing for this BAW resonator, lends itself to low cost manufacturing.

Our Commercialization Plan

We will continue to pursue filter design projects with existing and potential customers and other strategic partners, and we believe licensing our designs is the most direct and effective means of delivering our solutions to the market and validating the technical advantages of our tools, IP and team. In addition, we will continue to help develop a fabless filter eco-system to support the growth in the filter volumes for our customers. We will continue to develop XBAR® technology for both mobile and non-mobile applications, including 5G, WiFi and Ultra-WideBand (UWB) applications, forming strategic partnerships with filter manufacturers and customers to bring the technology to market as quickly as possible. We intend to retain ownership of our technology, designs and related improvements and charge royalties based on sales of filters that incorporate our designs. We do not intend to manufacture or sell any physical products or operate as a contract design company developing designs for a fee. Our strategy is to establish and leverage alliances with customers, who will help grow the market for our designs by integrating them with their own proprietary technology and products, thus combining their own particular strengths with ours to provide an extensive array of solutions and to develop and license filter designs that offer improvements in the time to develop, cost, size and performance of RFFEs. The goal for our designs is to improve profit margins and increase market share for our customers.

Our customers are filter manufacturers, RFFE module manufacturers, RF active and passive component suppliers and potentially mobile handset OEMs. Currently, for most of our customers, we license specific, custom designs. In the fourth quarter of 2018 we introduced and announced the first customer for our standard IP filter library of products. In these cases we develop a standard design at one of our qualified foundries and customers can then license this design without paying for or waiting for completion of development, hence minimizing their cost and reducing time to market. We charge royalties at a fixed amount per filter or as a percentage of sales price. In October 2019, we announced a commercial agreement with the industry's largest provider of filters for the RFFE to develop and license filters based on XBAR® technology. In this case, we determined the total amount of royalties expected to result from the licenses being designed and discounted the rate in exchange for prepayment of the amount in advance. The customer agreed to pay up to an aggregate of $9.0 million for the licensed designs and certain other intellectual property developed in the collaboration, payable in installments over a multi-year development period, with each installment conditional upon our achievement of certain milestones and deliverables acceptable to our customer in its discretion. During 2021 the customer entered into an addendum to the collaboration agreement which added up to four additional bands over a multi-year period, the first of which was added during the year. The addendum required an upfront non-refundable payment of $4.0 million and an aggregate of between $8.0 million and $36.0 million, depending on the complexity of the selected bands. The additional band selected during 2021 required an upfront non-refundable fee of $3.0 million and milestone payments totaling $3.0 million due upon the occurrence of certain future events. We expect to generate substantially all of our near-term revenues with these types of licensing arrangements. Each filter design and related royalty stream is expected to have a finite commercial life as mobile devices continue to evolve. Our plan is to offer our customers

replacement designs as existing designs become obsolete. Revenue from our contracts may be recognized over time or at a point-in-time depending on the facts and circumstances of each contract.

Our products will be designed for manufacture with existing high-volume fabrication processes allowing rapid time to market, but we do not plan to manufacture or sell any physical components. Unlike a manufacturing company, we intend to create designs for manufacturers, eliminating for us the costs and problems associated with manufacturing and inventory. This allows us to concentrate on our unique expertise, leaving the hardware manufacturers to drive their own economies of scale.

We also believe that the power of Resonant WaveX™ tools and methodology will continue to enable fabless customers and filter foundries to newly enter or expand their participation in the supply chain for RF filters. In late 2016, we expanded our customer focus to include fabless filter manufacturers, which are companies that do not have their own internal filter fabrication facility. Typically, these companies already are supplying other products in the RFFE to the OEM, and as a result, do not require a protracted new vendor qualification process in order to supply parts. In 2017, to further facilitate our fabless filter program and to provide manufacturing stability across the supply chain to our fully integrated filter customers, we created our Foundry Program. It is through this program that we can enable a secure supply chain for all our customers. In 2019, we began development of Filter IP Standard Library designs to enable faster time to market for our customers.

Single Band Designs

We continue to develop a series of SAW filter designs for RF frequency bands presently dominated by the larger and more expensive BAW filters. In 2020, we continued to develop single band, SAW filter designs for customers. Some of these filter designs are for duplexers that have historically been TC-SAWs or BAWs while others are for discrete SAW filters that may need improvements in performance, size or cost. The single band designs included WiFi Co-Existence filters, which pass licensed wireless frequencies, while protecting against WiFi interference, and designs for module applications which require wafer-level packaging (WLP) and modeling of the module board. We believe that, using our WaveX™ technology, combined with our experience and know-how, we can design innovative SAW filters that meet the performance requirements for many of these bands but at significantly less cost than that of BAW filters they would replace. These single band filter designs were the earliest opportunity for royalty revenues.

Multiplexer Designs

Wireless carriers worldwide are experiencing increasing demand for higher data speeds. CA allows multiple data streams from different frequencies to be added together to provide increased data rate for the mobile users. However, CA further complicates the required filter characteristics. Quadplexers, (4-RF path multiplexer) as described above, enable CA on both receive and transmit paths and reduce the RFFE complexity by reducing the number of switches, but the complexity of the filters themselves increases dramatically. During 2018, we expanded our capability to optimize the performance of quadplexers on OEM phone-boards in order to help our customers demonstrate "real world" performance. During 2019, we expanded our capability to produce TC-SAW and high power quadplexer designs. We believe that our WaveX™ design platform is ideally suited to these difficult filter design problems that cover a wide frequency range with much more demanding performance requirements.

Although some band combinations for aggregation will not require multiplexers, we believe that multiplexers are the best solution for bands in close frequency proximity. We are developing high performance multiplexer designs to address this growing market.

XBAR® Filters

Our WaveX™ design platform enabled us to invent a new resonator technology, XBAR®. Large instantaneous bandwidth filters at high frequency (above 3GHz) are required for next generation wireless technologies, such as 5G, WiFi 6E and UWB, to support high data-rates. Filters using XBAR® resonators are ideally suited for these applications. During 2021, we continued to develop XBAR® filter designs for our partner, focused on the mobile market. In addition, we designed and had fabricated through our foundries XBAR® designs for 5G and WiFi non-mobile applications

Our immediate focus is to address the problems in the RFFE with innovative single-band and multiplex designs made possible with our WaveX™ design platform. These designs present the greatest near-term potential for commercialization of our technology. We expect the trend towards spectrum proliferation, particularly with new 5G spectrum, in addition to CA and MIMO, will require complex filters and multiplexing. We believe our WaveX™ and XBAR® technology will enable cost effective designs for these applications.

Intellectual Property

We have an active program protecting our proprietary technology. In protecting our technology, we make use of patent, trade secret, trademark and mask works protections. To maximize these protections, we maintain active intellectual property development and protection programs, including with respect to patents, trade secrets, trademarks and mask works.

Our patent portfolio is the result of an active and ongoing program to identify, protect and commercialize our intellectual property. This program includes the development of a comprehensive patent strategy. We engage in a thorough process of patent landscaping that provides an in-depth analysis of not only the markets we are addressing, but also adjacent markets, so that we can tactically and strategically protect our position in the market through patent filings. We also routinely use specialized outside firms to assist in these endeavors. These firms assist with invention identification, intellectual property strategy and competitive landscape analysis. Through our landscaping and advanced product development processes we have plans to file additional patents in 2022.

Our patent portfolio comprises more than 415 issued and pending U.S. and foreign patents, with more than 265 targeting XBAR. This patent portfolio relates primarily to the following subject matters:

- Physical Implementation
- Design Synthesis and Optimization Speed
  - Network Synthesis
  - Image Design
  - Circuit Designs
- Simulation Accuracy
- Next Generation Designs/Architectures
  - Simplifying the RFFE
  - XBAR
- Circuit Structure
- Critical Design Requirements
  - Power handling and linearity
  - Temperature dependence
  - Yield Analysis

We have a formal trade secret program to identify and protect technologies and know-how that derive significant economic value from being secret. This program is managed to provide the optimal levels of protection and competitive advantage to us. We protect our trade secrets and other proprietary information by maintaining the secrecy of such information, including by requiring confidentiality agreements from all our employees, consultants and third parties having access to such information. We have a number of trade secrets already protected in this program and we expect to add more such trade secrets into the program in 2022.

We have also registered U.S. trademarks for ‘‘Resonant®’’, ‘‘WaveX™”, and “XBAR®”.

There can be no assurance that our pending patent applications or any future patent applications will be approved or will not be challenged successfully by third parties, that any issued patents will protect our technology or will not be challenged by third parties, or that the patents of others will not have an adverse effect on our ability to do business. Furthermore, there can be no assurance that others will not independently develop similar or competing technology or design around any patents that have been or may be issued to us.

Despite our efforts to maintain the secrecy of our trade secrets, there also can be no assurance that others will not gain access to our trade secrets, or that we can meaningfully protect our technology. Nor can there be assurances that we will succeed in enforcing our trade secrets in the event others improperly gain access to them. In addition, effective trademark, copyright and trade secret protection may be unavailable or limited in certain foreign countries. Although we intend to protect our rights vigorously, there can be no assurance that such measures will be successful.

Competition

To our knowledge, we have no direct competitors in the electronic design automation or licensing business that are exclusively focused on RFFEs. We have spent many years developing WaveX™, and our own patented suite of design tools created specifically for this purpose. No comparable acoustic wave filter design tool exists in the market today to our knowledge. In combination with our experienced design team, we believe we offer our customers a novel solution to the need

for increasingly complex filter designs developed by an independent, stand-alone company that is not presently offered by any other company.

We have advantages that we believe present significant barriers to entry for potential competitors that desire to replicate our business model:

- a large and growing portfolio of patents and trade secrets;
- a suite of proprietary software design tools;
- a growing number of customers;
- a highly experienced design team; and
- a multi-year technology lead.

We do compete with the existing filter designs and design capabilities of the design teams at our customers and target customers and their filter manufacturers. We must demonstrate to our customers, target customers and their filter manufacturers, that switching to our designs will give them a competitive advantage by providing market entry or sufficiently improving the cost, size, and performance of their current products to justify our royalty rates.

The use of our patented WaveX™ tools, not only enables lower cost and smaller size SAW solutions for single band and multiplexer designs but also enables development of creative filter solutions for next generation RFFE architectures that, if successful will offer new, highly competitive solutions to many of the challenges facing the manufacturers of RFFE modules.

Human Capital Resources

We have 73 employees as of December 31, 2021, 54 of which are on our technical staff and 19 of which are devoted to finance, sales, marketing and administration matters. We compete for the limited number of highly talented RF filter engineers and work to attract and retain technical talent through offering competitive compensation and benefit packages. We are focused on retaining key contributors, developing our staff, and cultivating their commitment to our Company. We have three primary locations, in California and Texas, where our employees provide services. We also use several outside consultants.

Where You Can Find Other Information

Our principal executive offices are located at 10900 Stonelake Blvd., Suite 100, Office 02-120, Austin, Texas 78759, and our telephone number is 805-308-9803. We also have development offices in Goleta, California, San Mateo, California and Neuchatel, Switzerland and lease office space in Anyang, South Korea. Our website address is www.resonant.com. The information contained on, or that can be accessed through, our website is not a part of this report. Information we furnish or file with the SEC, including our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to or exhibits included in these reports are available for download, free of charge, on our website soon after such reports are filed with or furnished to the SEC. Our SEC filings, including exhibits filed therewith, are also available at the SEC's website at www.sec.gov.

ITEM 1A. RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below, together with all of the other information in this Form 10-K, including our consolidated financial statements and related notes, before investing in our common stock. If any of the following risks materialize, our business, financial condition, results of operations and prospects could be materially and adversely affected. In that event, the price of our common stock could decline, and you could lose part or all of your investment.

Risks Specific to our Company

If our pending acquisition by Murata does not close, our operations after any termination of the Merger Agreement may suffer from the effects of business uncertainties resulting from announcement of the transaction, contractual restrictions on our activities during the period in which we are subject to the Merger Agreement, and costs associated with the proposed transaction.

Uncertainty about the effect of the proposed Offer and Merger on our employees, customers, and other parties may have an adverse effect on our business. Such uncertainty may impair our ability to attract, retain, and motivate key personnel, including our executive leadership, and could cause existing and future customers, suppliers and others to seek to change existing business relationships with us or refuse to do business with us.

The Merger Agreement places limitations on our ability to engage in certain types of transactions without Murata's consent during the period between the signing of the Merger Agreement and the Effective Time. During this period, we may not raise additional capital through the sale of securities or incur debt. Further, other than in transactions in the ordinary course of business or within specified dollar limits and certain other limited exceptions, we generally may not acquire other businesses, make investments in other persons, or sell, lease, or encumber our assets.

If the Offer and Merger do not close and the Merger Agreement is terminated, we may be unable to raise additional capital to fund our operations for an extended period post-termination.

We have incurred, and will continue to incur, significant costs, expenses, and fees for professional services and other transaction costs in connection with the proposed Offer and Merger. Many of the fees and costs will be payable by us even if the Offer and Merger are not completed.

If our pending acquisition by Murata does not close, the price of our common stock likely will decline.

The Per Share Amount of $4.50 represents approximately a 266% premium to the closing price of our common stock of $1.23 per share on February 14, 2022, immediately prior to announcement of our pending acquisition by Murata, a 227% premium to the 20 trading day volume weighted average stock price of our common stock, and a 157% premium to the 60 trading day volume weighted average stock price of our common stock. If the Offer and Merger do not close and the Merger Agreement is terminated, our stock price likely will decline to or below the prices in effect prior to announcement of our pending acquisition.

Following announcement of the Merger Agreement and commencement of the Offer, numerous lawsuits have been filed against us and members of our Board of Directors, which could delay or prevent consummation of the Offer and the Merger and could have a material adverse effect on our business, results of operations and financial condition.

Numerous lawsuits have been filed against us and members of our Board of Directors and executives, as described in Item 3-Legal Proceedings. These lawsuits seek, among other things, an order enjoining consummation of the Offer and the Merger, rescission of such transactions if they have already been consummated or rescissory damages, and awards of attorneys' and experts' fees. These lawsuits may divert financial and management resources that would otherwise be used to benefit our operations. We and our officers and directors believe that the claims asserted in the lawsuits are without merit and intend to vigorously defend our positions. However, a negative outcome in any lawsuit could have a material adverse effect on us if it results in preliminary or permanent injunctive relief or rescission of the transactions contemplated by the Merger Agreement. In addition, although we have directors and officers liability insurance, we anticipate that we will incur significant expense within our self-insured retention under that insurance. We are not currently able to predict the outcome of any of the lawsuits with any certainty. Additional lawsuits arising out of or relating to the transactions contemplated by the Merger Agreement may be filed in the future.

We may require additional capital to continue operations in the future, which capital may not be available on terms acceptable to us, if at all.

As of December 31, 2021, our accumulated deficit totaled $186.9 million. During 2021 our net loss totaled $36.0 million and we used $22.1 million of cash and investments for operating activities, the purchase of property and equipment and expenditures for patents. To date we have not generated significant revenues to enable profitability. We expect to continue to incur significant losses. These factors raise substantial doubt regarding our ability to continue as a going concern. At December 31, 2021 we had cash and cash equivalents of $21.2 million. In the absence of additional customer contracts, we believe these cash resources, along with anticipated cash generated from existing customer contracts, will provide sufficient funding into the third quarter of 2022. We are subject to the risks and uncertainties associated with a new business. Our continuance as a going concern is dependent on future profitability. We are actively pursuing expanding our technology portfolio, increasing our revenue opportunities by completing deliverables under current customer contracts and entering into new customer contracts, and efficiently managing operations and exploring cost saving opportunities. We may not be successful in these efforts. We may need to seek to raise additional capital from the sale of equity securities or incurrence of indebtedness. There can be no assurance that additional financing will be available to us on acceptable terms, or at all in which case we might be forced to make substantial reductions in our operating expenses which could adversely affect our ability to implement our business plan and ultimately our viability as a company. Even if available, such capital may be dilutive to existing stockholders. Our consolidated financial statements have been prepared on a going concern basis which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. The consolidated financial statements do not include any adjustments relating to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty.

We have a history of operating losses and we may never achieve or maintain profitability or positive cash flows.

We have a limited operating history and utilize planned milestones for investors to evaluate our progress. We have generated minimal revenues and we have a history of losses from operations with an accumulated deficit as of December 31, 2021 of $186.9 million. Our operations have been funded primarily with initial capital contributions, proceeds from the sale of equity securities and debt. We intend to continue to make investments to support our business growth and may require additional funds to respond to business challenges, including the need to refine existing technology, develop new technology, improve our operating infrastructure or acquire complementary businesses and technologies. Our ability to generate revenues and achieve profitability and, ultimately, positive cash flows, may depend on whether we can obtain additional capital when we need it and will depend on whether we continue to refine our technology and find additional customers who will license our designs. There can be no assurance that we will ever generate meaningful revenues, or that the revenues we do generate will be sufficient to achieve profitability and positive cash flows.

Our business model is based on licensing filter designs, which is unproven. Historically, our target customers have relied on their own filter designs or purchased finished filters from a manufacturer, and have not licensed third-party designs. Consequently, we may not succeed in our licensing strategy, which would require us to adopt a new business model and would have a material adverse effect on our ability to generate revenues and potentially threaten our viability.

Our business model is based on licensing our proprietary filter designs. We do not intend to manufacture or sell any physical products or operate as a contract design company developing designs for a fee. We believe licensing our designs is the most direct and effective means of delivering our solutions to the market. We intend to retain ownership of our designs and charge royalties based on sales of filters and RFFE modules that incorporate our designs.

Our target customers either make part or all of the RFFE. These customers have historically used their own filter designs or purchased finished filters from a manufacturer. Our business model is new to the filter industry and remains unproven, as we have yet to receive meaningful royalty payments from our licensed designs. The failure to scale our business model would have a material adverse effect on our ability to generate revenues and potentially threaten our viability.

We may not be able to complete some of our designs because they do not meet our customers' expectations. Even if we succeed in developing a design that meets all of a customer's requirements, the customer could decline to use our design in their products. Further, our customer's product could fail in the marketplace. Any of these events would have a material adverse effect on our business and potentially threaten our viability.

We develop filter designs to meet our customers' stringent performance specifications. Our customers often ship pre-production samples of our designed filters to their customers for further evaluation. For some designs, mass production may commence. However, the filter qualification process is demanding and some designs will not result in volume production. If successfully developed and selected by our customer, our designs will compete against other technologies for inclusion in our customers' products. Our customers' final products will then compete against other products and technologies for inclusion in mobile devices in the marketplace. There can be no assurance that we can complete our designs, that our final designs will have acceptable performance and meet our customers' specifications, or if our pre-production sample filter shipments will be selected for production. Even if our filter designs have acceptable performance, there are a number of other considerations

influencing the customer's decision whether to use our design, such as packaging type and manufacturing cost, many of which are beyond our control. The decision to use our designs is solely within our customers' discretion. Further, if our filter design is selected by a customer for inclusion in its design or product, there is no guarantee that the customer's design or product will be selected for inclusion in mobile devices or, even if selected, result in high-volume sales and meaningful revenues. The failure of a significant number of our designs to be selected at the design stage or the device stage would have a material adverse effect on our business and potentially threaten our viability.

We are not a filter manufacturer, and thus we are reliant on filter fabricators or manufacturers to manufacture filters from our designs. For some of our customers that will not themselves manufacture filters from our designs, we may be required to have our customer approve the filter manufacturer, and the customer will not license our design unless the manufacturer can demonstrate the ability to economically produce the filter in large volumes.

We are a filter design company and will not commercially manufacture any products. Our business model is to license our designs to customers, who will manufacture our designs themselves or rely on third party manufacturers, commonly referred to as foundries, to fabricate our designs for integration into the customer's overall product. We are dependent on foundries' filter fabrication processes and capabilities for our filter designs. Even with a fully compliant filter design, the customer may not license our design unless the manufacturer can demonstrate the ability to economically produce the design in large volumes. We do not have any control over the manufacturer and cannot provide assurances that the manufacturer will have the necessary technology, skills and resources to successfully manufacture filters from our designs in commercial quantities. Additionally, foundries may refuse to manufacture filters from our designs. Many foundries offer potentially competitive filter technology as part of their standard product line or offer the services of in-house design teams which may consider us competition. In this case, our customers may face resistance by their foundries to manufacture our designs. The reluctance of foundries to manufacture our designs could adversely affect the market acceptance of our designs.

Our designs are complex, may contain latent defects, and may prove difficult to manufacture in commercial quantities. We will be relying on our customers and filter fabricators or manufacturers to build filters from our designs. Our business could fail if they encounter difficulties manufacturing filters in commercial quantities.

We develop complex filter designs, which is inherently challenging. Only a small number of our designed filters are currently in production, and therefore we cannot be certain our methods and testing procedures are adequate to detect latent design defects. If any of our designs contain latent defects, we may be unable to correct these problems. Additionally, we rely on our customers and filter fabricators or manufacturers to manufacture our designed filters. They will need to manufacture filters in commercial quantities at an acceptable cost, and we have little or no control over the manufacturing process. They must also operate and maintain sophisticated manufacturing equipment, and equipment failures can have adverse consequences on production volumes, yields and schedules. They may encounter difficulties in scaling up production, including problems with quality control, raw material and component supply shortages, low manufacturing yields, increased costs, shortages of qualified personnel and/or difficulties associated with compliance with regulatory requirements. Any of these problems may adversely affect the timing and amount of our future revenues. Additionally, if our customers and their suppliers encounter difficulties manufacturing filters from our designs in commercial quantities, our business could fail.

We develop and test our designs under laboratory conditions using low volume production samples. Once in production, our designs may not perform as well, or prove unreliable, due to manufacturing variations and operating conditions. This could adversely affect our business.

We develop and test our designs under laboratory conditions using low volume production samples. The transition from product development to commercial production requires high volume manufacturing which introduces product variations. These variations can adversely affect performance and reliability. Similarly, our designs may not perform as well or prove sufficiently reliable under actual operating conditions. This could adversely affect our business.

Failures in the products or services of our customers, including those resulting from defects or errors, could result in decreased sales and harm our business.

Our success depends in large part on the demand for mobile wireless devices and other products that incorporate our proprietary filter designs. Our customers' products are inherently complex and may contain defects or errors unrelated to our designs that are detected only when the products are in use. Any defects or errors in the products of our customers could result in product recalls or the discontinuation of those products, which could have an adverse impact on our operating results due to a delay or decrease in demand for our designs. Further, security failures, defects or errors in mobile wireless devices, such as the issues with the Galaxy Note 7 in 2016 that caused Samsung to discontinue that product, have led to increased scrutiny of component suppliers. If our customers do not perceive our designs to be of high quality, or if mobile device manufacturers do

not perceive the products of our customers to be of high quality, or if we or our customers are unable or unwilling to comply with heightened quality assurance requirements of mobile device manufacturers, we may be unsuccessful in having our designed filters incorporated into finished products. In certain instances we perform failure analysis and reliability testing of our customers' parts. If our analysis and testing prove to be faulty or insufficient, including due to failure of our laboratory equipment or human error, and our customers rely upon the results we provide, our reputation may be damaged, and customers may be reluctant to utilize our services or license our designs. This could harm our ability to attract customers and negatively impact our financial results, and may result in claims against us by our customers or others.

We have completed and continue to actively work on filter designs with, and expect to derive all of our revenues from, a small number of customers. Our failure to retain or expand customer relationships will have an adverse effect on our revenues.

We expect to derive our revenues from a small number of customers. Our failure to retain or expand customer relationships, or any problems we experience in collecting receivables from them, would harm our financial condition and results of operations. Additionally, our industry is experiencing consolidation among suppliers and manufacturers of RF front-end components and modules, including activities of module suppliers who vertically integrate by acquiring component suppliers and fabs. This may lead to fewer customers, reduced demand for our designs and replacement of our designed products by the consolidated company. Any of these possibilities could adversely affect our business, financial condition and results of operations.

We are a solutions company, providing designs based on our WaveX™ software platform, intellectual property and design team. We license our designs to manufacturers of RFFEs, RFFE sub-systems and components for mobile devices. If our designs do not achieve widespread market acceptance among RFFE manufacturers, we will not be able to generate the revenue necessary to support our business.

Achieving additional acceptance among RFFE manufacturers of our designs will be crucial to our continued success. We have a limited history of marketing designs and we may fail to generate significant interest in our designs. These and other factors may affect the rate and level of market acceptance, including our royalty fees and the cost of our designed filters relative to other competing designs and technologies, perception by RF front-end manufacturers and mobile device manufacturers, press and blog coverage, social media coverage and other publicity and public relations factors which are not within our control and regulatory developments related to manufacturing, marketing and selling our designs. If we are unable to achieve or maintain market acceptance, our business would be harmed.

Our designs may not gain widespread acceptance unless they offer greater benefits to our customers than offered by competing RF filter designs.

RF front-end manufacturers are primarily concerned with the cost, size and performance of RF filters. Our designs may not gain widespread acceptance unless, as compared to competing RF filter designs, they are smaller in size, can be fabricated at reduced cost or designed in less time, or improve performance. There can be no assurance that our SAW or TC-SAW filter designs will cost sufficiently less to manufacture than existing BAW filters, or can be designed in less time, to prove economically attractive to RF front-end manufacturers or that our filter designs will be smaller in size or perform better.

Our development cycles are long and our final designs may no longer remain competitive upon completion.

We operate in an industry which is subject to rapidly evolving technologies. Because our designs are expected to have long development cycles, we must anticipate changes in the marketplace and the direction of technological innovation and customer demands. To compete successfully, we will need to demonstrate the advantages of our designs and technologies.

Our intellectual property rights may not be adequate to protect our business

Our success depends significantly on our ability to obtain, maintain and protect our proprietary rights to the technologies used in products incorporating our technologies. We currently hold patents related to various elements of our technology and we also have patent applications currently pending before the United States Patent and Trademark Office and other patent offices around the world. No assurances can be given that any patent will be issued on our pending patent applications or any other application that we may file in the future or that, if such patents are issued, they will be sufficiently broad to adequately protect our technology. In addition, we cannot assure you that any patents that may be issued to us will not be challenged, invalidated, or circumvented.

Additionally, as we continue to expand our business in China, the application and interpretation of China's intellectual property right laws and the procedures and standards for granting trademarks, patents, copyrights, know-how or other

intellectual property rights in China will become more important to our business. Historically, China's protection of intellectual property rights has been less stringent and robust compared to other countries such as the United States, and consequently intellectual property rights and confidentiality protections in China may not be as effective as in the United States or other countries. Monitoring and preventing unauthorized use is also difficult and the measures we take to protect our intellectual property rights may not be adequate. Accordingly, infringement of our intellectual property rights poses a serious risk of doing business in China.

If we are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology, products and services could be harmed significantly.

In addition to seeking patents for some of our technologies, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, consultants, collaborators, advisors, independent contractors and other third parties. We also enter into confidentiality, non-competition, non-solicitation, and invention assignment agreements with our employees and consultants that obligate them to assign to us any inventions developed in the course of their work for us. However, we cannot guarantee that we have executed these agreements with each party that may have or have had access to our trade secrets or that the agreements we have executed will provide adequate protection. Additionally, we also seek to preserve the integrity and confidentiality of our technologies and trade secrets by maintaining physical and electronic security of our premises and information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for such breaches. Furthermore, competitors may otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. As a result, we may be forced to bring claims against third parties, or defend claims that they bring against us, to determine ownership of what we regard as our intellectual property. Monitoring unauthorized disclosure is difficult and we do not know whether the procedures that we have followed to prevent such disclosure are or will be adequate. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States may be less willing or unwilling to protect trade secrets. If any of the technology or information that we protect as trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to, or independently developed by, a competitor, our competitive position would be harmed.

Our proprietary rights may be difficult to enforce, which could enable others to copy or use aspects of our intellectual property without compensating us, thereby eroding our competitive advantages and harming our business.

Our success depends, in part, on our ability to protect proprietary methods and technologies that we develop under the intellectual property laws of the United States, so that we can prevent others from using our inventions and proprietary information. If we fail to protect our intellectual property rights adequately, our competitors might gain access to our technology, and our business might be adversely affected. We rely on trademark, copyright, mask works, trade secret and patent laws, confidentiality procedures and contractual provisions to protect our proprietary methods and technologies. We currently hold patents and have pending patent applications related to our technology solutions. Valid patents may not be issued from our pending applications, and the claims allowed on any issued patents may not be sufficiently broad to protect our technology or offerings and services. Any patents we currently hold or that may be issued to us in the future may be challenged, invalidated or circumvented, and any rights granted under these patents may not actually provide us with adequate defensive protection or competitive advantages. Additionally, the process of obtaining patent protection is expensive and time-consuming, and we may not be able to prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner.

Policing unauthorized use of our technology is difficult. Additional uncertainty may result from changes to intellectual property legislation enacted in the United States, including the America Invents Act, and other countries and from interpretations of the intellectual property laws of the United States and other countries by applicable courts and agencies. In addition, the laws of some foreign countries may not be as protective of intellectual property rights as those of the United States, and mechanisms for enforcement of our proprietary rights in such countries may be inadequate. From time to time, legal action by us may be necessary to enforce our 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. Such litigation could result in substantial costs and the diversion of limited resources and could negatively affect our business, operating results and financial condition. If we are unable to protect our proprietary rights (including aspects of our technology platform) we may find ourselves at a competitive disadvantage to others who have not incurred the same level of expense, time and effort to create and protect their intellectual property.

Furthermore, we acquired some of the patents we currently hold from Superconductor Technologies, Inc., or STI. Although we believe we have obtained valid assignments of patent rights from STI and STI has obtained valid assignments of patent rights from all inventors, if an inventor did not adequately assign his or her patent right to STI or STI did not adequately assign its patent rights to us, a third party could obtain a license to the patent from such inventor or STI. This could preclude us from enforcing the patent against such third party. In addition, because we acquired our patents from STI, some of the inventors of our patents are not our employees and they are not obligated to assist us in prosecuting, maintaining, defending and enforcing such patents. Without the cooperation of the inventors of our patents, it may be difficult for us to prevail in any legal action involving the intellectual property rights under our patents. Additionally, the inventors may have information, trade secrets and know-how learned while at STI that is not our property and if disclosed could provide competitors with insights that allow them to invent around our patented technology.

Accordingly, despite our efforts, we may be unable to obtain adequate patent protection, or to prevent third parties from infringing upon, misappropriating or inventing around our intellectual property.

We may be subject to intellectual property rights claims by third parties, which are extremely costly to defend, could require us to pay significant damages and could limit our ability to use certain technologies.

Third parties may assert claims of infringement of intellectual property rights in proprietary technology against us for which we may be liable or have an indemnification obligation. Any claim of infringement by a third party, even those without merit, could cause us to incur substantial costs defending against the claim and could distract our management from our business.

Although third parties may offer a license to their technology, the terms of any offered license may not be acceptable and the failure to obtain a license or the costs associated with any license could cause our business, results of operations or financial condition to be materially and adversely affected. In addition, some licenses may be non-exclusive, and therefore our competitors may have access to the same technology licensed to us. Alternatively, we may be required to develop non-infringing technology, which could require significant effort and expense and ultimately may not be successful. Furthermore, a successful claimant could secure a judgment or we may agree to a settlement that prevents us from licensing certain designs or performing certain services or that requires us to pay substantial damages, including treble damages if we are found to have willfully infringed the claimant's patents or copyrights, royalties or other fees. Any of these events could seriously harm our business, operating results and financial condition.

We may be unsuccessful in monetizing our intellectual property portfolio.

We have dedicated substantial resources to the development and protection of technology innovations essential to our business, and we expect these activities to continue for the foreseeable future. We also intend to aggressively pursue monetization avenues for our intellectual property portfolio, potentially including licensing, royalty or other revenue-producing arrangements. However, our revenues are currently generated in part by licensing our technology and we may never be successful in generating a revenue stream from our intellectual property, in which case our investments of time, capital and other resources into our intellectual property portfolio may not provide adequate, or any, returns.

Our customer agreements include indemnity provisions and may expose us to substantial liability for intellectual property infringement and other losses.

Our customer agreements include indemnification provisions under which we agree to indemnify third parties for losses suffered or incurred as a result of claims of intellectual property infringement, damages caused by us to property or persons, or other liabilities relating to or arising from our designs, services, or other contractual obligations. The term of these indemnity provisions generally survives termination or expiration of the applicable agreement. Large indemnity payments could harm our business, operating results and financial condition.

We use highly specialized proprietary software as well as commercially available software pursuant to annual licenses, and the failure of this software or inability to renew any of these licenses could adversely affect our ability to design new RF filters and thus our potential for generating revenues.

We have developed and use highly specialized proprietary computer software in our design process. The failure of any of this software to perform as expected could adversely affect our ability to produce new RF filter designs and thus our potential for generating revenues. In addition to our proprietary software, we also use highly specialized but commercially available computer software in our design process. We do not own this software and use it under the terms of licenses. These licenses are made available to us at prices and on terms generally available to any customer. If we were unable to renew any of

these software licenses, we would have to locate or develop alternative software. We cannot assure you that suitable alternative software would be available on commercially reasonable terms or could be developed by us at reasonable cost. The loss of any one of these software licenses could adversely affect our ability to produce new RF filter designs and thus our potential for generating revenues.

Risks Related to Our Industry

Our industry is subject to intense competition and rapid technological change, which may result in designs, products or new solutions that are superior to our designs under development. If we are unable to anticipate or keep pace with changes in the marketplace and the direction of technological innovation and customer demands, our designs may become less useful or obsolete and our operating results will suffer.

We operate in an industry which is subject to intense and increasing competition. Our future success will depend in large part on our ability to establish and maintain a competitive position in current and future technologies. Rapid technological development may render our designs and technologies obsolete. Many of our competitors have or may have greater engineering, sales, marketing, operational, corporate and financial resources, and more experience in research and development than we have. We cannot assure you that our competitors will not succeed in developing or marketing technologies or products that are more effective or commercially attractive than our designs or that would render our technologies and designs obsolete. We may not have or be able to raise or develop the financial resources, technical expertise, or support capabilities to compete successfully in the future. Our success will depend in large part on our ability to maintain a competitive position with our technologies.

The markets in which we compete are cyclical and any future downturn may delay or reduce the demand for our designs and resulting royalty revenue.

Historically, the markets in which we compete have experienced significant downturns, often connected with, or in anticipation of, declines in consumer demand for end-user products, the maturation of product cycles and declining general economic conditions. These downturns have been characterized by diminished product demand, production overcapacity, high inventory levels, accelerated erosion of average selling prices, bad debt, inventory charges, restructuring charges, and asset impairment charges. Any future downturn in the markets in which we compete, or changes in demand for our designs from our customers, could result in a significant delay in our realization of or reduction in our revenue and may also increase the volatility of the price of our common stock.

If our principal end markets fail to grow or experience declines, our revenue may not meet our business plan expectations.

Our initial designs are being incorporated into mobile wireless devices. Accordingly, demand for our designs is dependent on the ability of mobile wireless device manufacturers to successfully sell wireless devices that incorporate our designs. We cannot be certain whether these manufacturers will be able to create or sustain demand for their wireless devices that contain our designs or how long they will remain competitive in their business, if at all. The success of these mobile wireless device manufacturers and the demand for their wireless devices can be affected by a number of factors, including, but not limited to:

- market acceptance of their mobile wireless devices that contain our designs;
- the impact of slowdowns or declines in sales of mobile wireless devices in general;
- their ability to design products with features that meet the evolving tastes and preferences of consumers;
- fluctuations in foreign currency;
- relationships with wireless carriers in particular markets;
- the implementation of, or changes to, mobile wireless device certification standards and programs;
- technological advancements in the functionality and capabilities of mobile wireless devices;
- the imposition of restrictions, tariffs, duties, or regulations by foreign governments on mobile wireless device manufacturers;
- failure to comply with governmental restrictions or regulations;
- cost and availability of components for their products; and
- inventory levels in the sales channels into which mobile wireless device manufacturers sell their products.

Security breaches and improper access to or disclosure of our proprietary information, or other hacking attacks on our systems, could adversely affect our business.

Our industry is prone to cyber-attacks, with third parties seeking unauthorized access to our proprietary information and technology. Computer malware, viruses, and hacking and phishing attacks by third parties have become more prevalent in our industry and may occur on our systems in the future. We believe such attempts are increasing in number and in technical sophistication, and in some instances we may be unable to anticipate these techniques or to implement adequate preventative measures. Additionally, we may be unaware of an incident or its magnitude and effects. Although we have developed systems and processes that are designed to protect our proprietary information and to prevent other cybersecurity breaches, we cannot guarantee that such measures will provide absolute security.

Any failure to prevent or mitigate security breaches and improper access to or disclosure of our proprietary information could result in the loss or misuse of such proprietary information, which could harm our business and diminish our competitive position. Such attacks may also create system disruptions or cause shutdowns. Publicity about vulnerabilities and attempted or successful incursions could damage our reputation with customers and reduce demand for our products and services.

Affected private parties or government authorities could initiate legal or regulatory actions against us in connection with any security breaches, which could cause us to incur significant expense and liability or result in orders or consent decrees forcing us to modify our business practices. Any of these events could have a material and adverse effect on our business, reputation, and operating results.

Risks Related to Government Regulation

Our failure to comply with U.S. laws and regulations relating to the export and import of goods, technology, and software could subject us to penalties and other sanctions and restrict our ability to license and develop our filter designs.

We are obligated by law to comply with all U.S. laws and regulations governing the export and import of goods, technology, and services, including the International Traffic in Arms Regulations, or ITAR, the Export Administration Regulations, or EAR, regulations administered by the Department of Treasury's Office of Foreign Assets Control, and regulations administered by the Bureau of Alcohol Tobacco Firearms and Explosives governing the importation of items on the U.S. Munitions Import List. Pursuant to these regulations, we are responsible for determining the proper licensing jurisdiction and export classification of our filter designs, and obtaining all necessary licenses or other approvals, if required, for exports and imports of technical data, and software, or for the provision of technical assistance or other defense services to or on behalf of foreign persons. We are also required to obtain export licenses, if required, before employing or otherwise utilizing foreign persons in the performance of our contracts if the foreign person will have access to export-controlled technical data or software. The violation of any of the applicable laws and regulations could subject us to administrative, civil, and criminal penalties.

These regulations could restrict our ability to license existing filter designs and develop new designs. For example, as a result of ITAR requirements, we are unable to supply certain products to China satellite companies or end users, which comprise a significant part of the overall satellite market. Changes in our designs or changes in export and import regulations may create delays in the introduction of our designs in international markets, prevent our customers with international operations from deploying products incorporating our designs throughout their global systems or, in some cases, prevent the export or import of product including our designs to certain countries altogether. Any change in export or import regulations or related legislation, shift in approach to the enforcement or scope of existing regulations, or change in the countries, persons, or technologies targeted by such regulations, could result in decreased use of our designs by, or our ability to export or license our designs to, existing or potential customers with international operations and decreased revenue. For example, in late 2020 the U.S. Bureau of Industry and Security of the U.S. Department of Commerce placed a China-based customer of ours on the Bureau's Entity List, which resulted in our suspending exports of our technologies to this customer while we seek a limited export license from the U.S. Department of Commerce. Any failure to comply with these laws could result in sanctions by the U.S. government, including substantial monetary penalties, denial of export privileges, and debarment from government contracts.

Changes in China's economic, political or social conditions or government policies, including rising tensions between China and the United States, could have a material adverse effect on our business and results of operations.

Our business, prospects, financial condition and results of operations may be significantly affected by the political, economic and social climate in China, including without limitation the rising tensions in the relationships between China, surrounding Asian countries, and the United States. As a result, our customers may incur increases in costs due to changes in tariffs, import or export restrictions (or other trade barriers), or unexpected changes in regulatory requirements, which could harm our business. Given the relatively fluid regulatory environment in China, there could be additional tax or other regulatory changes in the future. Such actions in the future, as well as other changes in Chinese laws and regulations, including actions in

furtherance of China's stated policy of reducing its dependence on foreign semiconductor manufacturers, could increase the cost of doing business in China, foster the emergence of Chinese-based competitors, decrease the demand for our customers' products in China, or reduce the supply of critical materials for our customers' products, which could have a material adverse effect on our business and results of operations.

If we fail to comply with anti-bribery laws, including the U.S. Foreign Corrupt Practices Act, or FCPA, we could be subject to civil and/or criminal penalties.

As a result of our international operations, we may be subject to anti-bribery laws, including the FCPA, which prohibits companies from making improper payments to foreign officials for the purpose of obtaining or keeping business. If we fail to comply with these laws, the U.S. Department of Justice, the SEC, or other U.S. or foreign governmental authorities could seek civil and/or criminal sanctions, including monetary fines and penalties against us or our employees, as well as additional changes to our business practices and compliance programs, which could have a material adverse effect on our business, results of operations, or financial condition.

Developments stemming from changes in Government administrations, both foreign and domestic, including the imposition of tariffs and export restrictions and other changes in government trade policies, could limit our ability to license our designs, which could adversely affect our business.

Changes in Government administration could result in changes to political, regulatory and economic laws, policies and conditions that could severely and negatively impact our business. For example, the Trump administration negotiated a new North American trade pact to replace the North American Free Trade Agreement, withdrew the United States from the Trans-Pacific Partnership (TPP), and has imposed tariffs on goods imported into the United States, including from China, which has imposed retaliatory tariffs affecting certain products manufactured in the United States. Our customers are located around the world, and we expect that international sales will comprise a substantial portion of total sales in the future. In addition, we expect that products utilizing our designs will be produced, assembled and tested at third-party manufacturing facilities located primarily in Asia. Changes in U.S. political, regulatory and economic conditions or laws and policies governing U.S. tax laws, foreign trade, manufacturing, and development and investment in the countries where we or our customers operate could adversely affect our operating results and our business. For example, imposition of tariffs on our customers' products that are imported from China to the United States could harm sales of such products, which would harm our business. We cannot predict what actions may ultimately be taken with respect to tariffs or trade relations between the United States and China or other countries, what products may be subject to such actions, or what actions may be taken by the other countries in retaliation.

Changes in current laws or regulations or the imposition of new laws or regulations could impede the license of our designs or otherwise harm our business.

Wireless networks can only operate in the frequency bands, or spectrum, allowed by regulators and in accordance with rules governing how the spectrum can be used. The Federal Communications Commission, or the FCC, in the United States, as well as regulators in foreign countries, have broad jurisdiction over the allocation of frequency bands for wireless networks. We therefore will rely on the FCC and international regulators to provide sufficient spectrum and usage rules. For example, countries such as China, Japan or Korea heavily regulate all aspects of their wireless communication industries, and may restrict spectrum allocation or usage. If this were to occur elsewhere, it would make it difficult for us to license our designs for use in mobile devices in that region.

Risks Related to Ownership of our Stock

The price of our common stock may be volatile and the value of your investment could decline

Technology stocks have historically experienced high levels of volatility. The trading price of our common stock may fluctuate substantially, depending on many factors, some of which are beyond our control and may not be related to our operating performance. These fluctuations could cause you to lose all or part of your investment in our common stock. Factors that could cause fluctuations in the trading price of our common stock include, but are not limited to, the following:

- the progress, completion or failure of efforts to design our commercial products;
- a customer decision regarding incorporation of our designs into a commercial product;
- the loss of any customer relationship;
- the addition of a new customer relationship;
- mergers and acquisitions involving us, our customers or our competitors;
- price and volume fluctuations in the overall stock market from time to time;
- significant volatility in the market price and trading volume of technology companies in general;

- fluctuations in the trading volume of our shares or the size of our public float;
- actual or anticipated changes or fluctuations in our results of operations;
- whether our results of operations meet the expectations of securities analysts or investors;
- actual or anticipated changes in the expectations of investors or securities analysts;
- litigation involving us, our industry, or both;
- regulatory developments in the United States, foreign countries, or both;
- general economic conditions and trends;
- major catastrophic events;
- lockup releases, sales of large blocks of our common stock;
- departures of key employees; or
- an adverse impact on the company from any of the other risks cited herein.

In addition, if the market for technology stocks or the stock market in general, experience a loss of investor confidence, the trading price of our common stock could decline for reasons unrelated to our business, results of operations or financial condition. The trading price of our common stock might also decline in reaction to events that affect other companies in our industry even if these events do not directly affect us. Securities class action litigation has often been instituted against companies following periods of volatility in the overall market and in the market price of a company's securities. Two putative class action lawsuits were filed in March 2015 against the Company and certain members of the Board of Directors and executives and subsequently settled. We may be the target of securities-related litigation in the future. Such litigation could divert our management's attention and resources, result in substantial costs, and have an adverse effect on our business, results of operations and financial condition.

If we raise additional capital in the future, your ownership in us could be diluted.

Any issuance of equity we may undertake in the future to raise additional capital could cause the price of our common stock to decline, or require us to issue shares at a price that is lower than that paid by holders of our common stock in the past, which would result in those newly issued shares being dilutive. Any new equity securities we issue could have rights, preferences and privileges superior to those of holders of our common stock. Any debt financing that we secure in the future could involve restrictive covenants relating to our capital raising activities and other financial and operational matters, including the ability to pay dividends, which could impair the value of our common stock. This may make it more difficult for us to obtain additional capital and to pursue business opportunities.

Our limited operating history makes it difficult to evaluate our business and prospects and may increase the risks associated with your investment.

We have only a limited operating history upon which our business and future prospects may be evaluated. We have encountered and will continue to encounter risks and difficulties frequently experienced by companies in rapidly developing and changing industries, including challenges related to recruiting, integrating and retaining qualified employees; making effective use of our limited resources; achieving market acceptance of our existing and future solutions; competing against companies with greater financial and technical resources; and developing new solutions. Our current operational infrastructure may require changes for us to scale our business efficiently with additional technical personnel and effectively to keep pace with demand for our solutions, and achieve long-term profitability. If we fail to implement these changes on a timely basis or are unable to implement them effectively, our business may suffer. We cannot assure you that we will be successful in addressing these and other challenges we may face in the future. As a company in a rapidly evolving industry, our business prospects depend in large part on our ability to:

- build a reputation for a superior solution and create trust and long-term relationships with our customers;
- distinguish ourselves from competitors in our industry;
- develop and offer competitive technologies that meet our customers' needs as they change;
- respond to evolving industry standards and government regulations that impact our business;
- expand our business internationally; and
- attract, hire, integrate and retain qualified and motivated employees.

If we are unable to meet one or more of these objectives or otherwise adequately address the risks and difficulties that we face, our business may suffer, our revenue may decline and we may not be able to achieve growth or long-term profitability.

Our limited visibility into future demand for products incorporating our finished filter designs makes it difficult to forecast royalty revenue.

Our customers have had difficulty accurately forecasting their product sales volumes and the timing of new product introductions, which ultimately affects the royalties we expect to receive for sales of products incorporating our finished filter designs. Our limited visibility into the demand for our customers' products makes it difficult for us to accurately forecast royalty revenues, which we expect will continue for the foreseeable future.

Our charter documents and Delaware law could discourage takeover attempts and lead to management entrenchment.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could delay or prevent a change in control of our company. These provisions could also make it difficult for stockholders to elect directors that are not nominated by the current members of our board of directors or take other corporate actions, including effecting changes in our management. These provisions include:

- the ability of our board of directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of our board of directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our board of directors;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;
- the requirement that a special meeting of stockholders may be called only by the chairman of our board of directors, the chief executive officer, the president (in the absence of a chief executive officer) or a majority vote of our board of directors, which could delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors;
- the requirement for the affirmative vote of holders of at least 66-2/3% of the voting power of all of the then-outstanding shares of the voting stock, voting together as a single class, to amend the provisions of our amended and restated certificate of incorporation relating to the management of our business or our amended and restated bylaws, which may inhibit the ability of an acquirer to effect such amendments to facilitate an unsolicited takeover attempt;
- the ability of our board of directors, by majority vote, to amend our amended and restated bylaws, which may allow our board of directors to take additional actions to prevent an unsolicited takeover and inhibit the ability of an acquirer to amend our amended and restated bylaws to facilitate an unsolicited takeover attempt; and
- advance notice procedures with which stockholders must comply to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

In addition, as a Delaware corporation, we are subject to Section 203 of the Delaware General Corporation Law. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time.

General Risks

The ongoing, global coronavirus pandemic has significantly and adversely affected, and may continue to adversely affect, our business, financial position, results of operations and cash flows.

The ongoing COVID-19 pandemic has negatively impacted the United States, Asia and Europe, the major markets in which we operate. Although we have seen improvements in the United States, the major markets in which we operate continue to experience COVID-19 cases and recurring shutdowns. The pandemic's ultimate impact on our operations and financial performance depends in part on many factors not within our control and that vary by region, including, without limitation, restrictive governmental and business actions that continue to be taken in response (including travel restrictions and other workforce limitations).

Restrictions on travel and the imposition of stay-at-home or work remote conditions have impacted our operations and those of our clients. While we have not experienced major disruptions, clients have requested engagement deferrals and our employees' ability to deliver our products and services has been impacted. We continue to actively communicate with and listen to our customers to best ensure that we are responding to their needs in the current environment with innovative solutions that will not only be beneficial now but also over the long-term. However, our ability to interact with customers has been impacted by the current environment. For example, we believe that our inability to meet in-person with current or prospective customers, as well as the cancellation or postponement of Company-sponsored events or third-party events at which our products are featured, may have a negative impact on our business.

If restrictions continue for an extended period of time, we may, among other issues, experience delays in product development, a decreased ability to support our customers, further disruptions in sales and marketing activities and an overall lack of productivity. Similarly, significant outbreaks, continued travel restrictions, stay-at-home or work remote conditions, or other restrictions may impact our customers' ability to manufacture or deliver raw materials or provide key components or services, which could result in delays in the demand from our customers to produce designs. The pandemic may also impact the expansion of current and/or the roll out of new services which could impact our customers' demand for their products, which could reduce their demand for our products or services. While we don't know and cannot quantify specific impacts, we expect
we may be negatively affected if we encounter delays in our product development efforts, reductions in demand due to disruptions in the operations of our customers or their end customers, disruptions in local and global economies, volatility in the global financial markets, overall reductions in demand, or other COVID-19 ramifications.

We will continue to consider the potential impact of the COVID-19 pandemic on our business operations. Although no material impairment or other effects have been identified to date related to the COVID-19 pandemic, there is substantial uncertainty in the nature and degree of its continued effects over time. That uncertainty affects management's accounting estimates and assumptions, which could result in greater variability in a variety of areas that depend on these estimates and assumptions as additional events and information become known.

Our worldwide operations are subject to political, legal and economic risks and catastrophic events, such as natural disasters, war, acts of terrorism and epidemics that could disrupt the business of our customers or harm our facilities, which could have a material adverse effect on us.

Our customers are located around the world, including in the United States and Asia, and we expect that international sales will comprise a significant portion of total sales in the future. In addition, products utilizing our designs will be produced, assembled and tested at third-party manufacturing facilities located primarily in Asia. Consequently, we are subject to political, legal and economic risks associated with operations in foreign countries, including, without limitation:

- expropriation;
- changes in a specific country's or region's political or economic conditions;
- changes in tax laws, trade protection measures and import or export licensing requirements;
- difficulties in protecting our intellectual property;
- difficulties in managing staffing and exposure to different employment practices and labor laws;
- changes in foreign currency exchange rates;
- restrictions on transfers of funds and other assets of our subsidiaries between jurisdictions;
- changes in freight and interest rates;
- disruption in air transportation between the United States and overseas facilities;
- loss or modification of exemptions for taxes and tariffs; and
- compliance with U.S. laws and regulations related to international operations, including export control and economic sanctions laws and regulations and the Foreign Corrupt Practices Act.

In addition, our worldwide operations (or those of our business partners) could be subject to natural disasters such as earthquakes, tsunamis, flooding, typhoons and volcanic eruptions, war, acts of terrorism, pandemic events and the spread of disease, all of which are outside of our control and could disrupt manufacturing or other operations. For example, our Goleta and San Mateo operations are located near major earthquake fault lines in California. Any conflict or uncertainty in the countries in which we operate, including public health issues, safety issues, natural disasters, disruptions of service from utilities, nuclear power plant accidents or general economic or political factors, could have a material adverse effect on our business. Any of the above risks, should they occur, could result in an increase in the cost of components, production delays, general business interruptions, delays from difficulties in obtaining export licenses for certain technology, tariffs and other barriers and restrictions, longer payment cycles, increased taxes, restrictions on the repatriation of funds and the burdens of complying with a variety of foreign laws, any of which could ultimately have a material adverse effect on our business.

Our future revenue is inherently unpredictable. As a result, as our revenues increase our operating results are likely to fluctuate from period to period, and we may fail to meet the expectations of our analysts and investors, which may cause volatility in our stock price and may cause our stock price to decline.

As we generate revenue, we expect our quarterly and annual operating results to fluctuate significantly due to a variety of factors, some of which are outside of our control. Factors that could cause our quarterly or annual operating results to fluctuate include:

- a downturn in the markets for our customers' products;

- disruptions or delays in the manufacture of our designed filters, our customers' products, or the products into which our customers' products are incorporated, or in the supply of raw materials or product components used to produce such filters or products;
- a failure to anticipate changing customer product requirements;
- market acceptance of our designs;
- cancellations or postponements of previously placed orders for our customers' products;
- increased financing costs or any inability to obtain necessary financing;
- the impact on our business of any cost reduction measures;
- a loss of key personnel or the shortage of available skilled workers;
- economic conditions in various geographic areas where we or our customers do business;
- the impact of political uncertainties, such as government sequestration and uncertainties surrounding the federal budget, customer spending and demand for products incorporating our designs;
- other conditions affecting the timing of orders of our customers' products incorporating our designs;
- reductions in the royalty rates for our designs occasioned by a reduction in the prices for our customers' products, increases in the costs of raw materials used to produce our customers' products, or other factors;
- effects of competitive pricing pressures, including decreases in average selling prices of RF filters that compete with our filter designs, resulting in reduced royalty revenue;
- obsolescence of our designs;
- research and development expenses incurred with respect to new filter design introductions;
- natural disasters, such as hurricanes, earthquakes, fires, and floods;
- the emergence of new industry standards;
- the loss or gain of significant customers;
- the introduction of new designs and manufacturing processes;
- changes in technology;
- intellectual property disputes;
- customs (including tariffs imposed on products, or components thereof, into which our filter designs are incorporated, or the equipment used in the production of such products), import/export, and other regulations of the countries in which we do business;
- the occurrence of M&A activities; and
- acts of terrorism or violence and international conflicts or crises, including pandemic events and the spread of disease.

The loss of the services of our key management and personnel or the failure to attract additional key personnel could adversely affect our ability to operate our business.

A loss of one or more of our current officers or key employees could severely and negatively impact our operations. We have no present intention of obtaining key-man life insurance on any of our executive officers or management. Additionally, competition for highly skilled technical, managerial and other personnel is intense. As our business develops, we might not be able to attract, hire, train, retain and motivate the highly skilled managers and employees we need to be successful. If we fail to attract and retain the necessary technical and managerial personnel, our business may not grow, may suffer and might fail.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We maintain our principal office in Austin, Texas. We lease approximately 27,000 square feet of office and laboratory space, in Goleta, California under a lease that expires in November 2024 and provides us with one option to renew for an additional five years. Until January 2022, we leased an additional 5,250 square feet of office space in Burlingame, California, which was used by members of our technical team resident in the San Francisco Bay area. The lease expired in January 2022 and we replaced the Burlingame facility with a sublease of approximately 8,400 square feet of office space in San Mateo, California under a sublease agreement that is effective January 2022 and expires January 31, 2023 and provides us with the option to renew for one additional year. We also lease space for our international operations in Anyang, South Korea. We believe our current facilities are sufficient for our current operations, and that suitable additional space will be available to accommodate our anticipated growth.

ITEM 3. LEGAL PROCEEDINGS

Pending Lawsuits

Following announcement of the Merger Agreement and commencement of the Offer, the following lawsuits have been filed against the Company and members of the Company's Board of Directors and certain members of senior management:

United States District Court Stockholder Litigation

On March 1, 2022, Danny Key, a purported stockholder of the Company, filed a complaint against the Company and each member of the Company's Board of Directors in the United States District Court for the Southern District of New York, captioned Danny Key vs. Resonant, Inc., et al., Case No. 1:22-cv-01708 (the "Key Complaint"). The Key Complaint alleges that the defendants violated Sections 14(e), 14(d), and 20(a) of the Exchange Act by omitting and/or misrepresenting material information in the Solicitation/Recommendation Statement on Schedule 14D-9 of Resonant Inc. filed with the SEC on February 28, 2022 (the "Schedule 14D-9") (concerning, among other things, the sale process, the Company's financial projections, and financial valuation analyses provided by the Company's financial advisors) in connection with the proposed transaction contemplated by the Offer. The Key Complaint seeks, among other things, an order enjoining consummation of the transaction; rescission or rescissory damages in the event the transaction is consummated; an order directing the Board of Directors to disseminate a revised Schedule 14D-9; and an award of plaintiff's costs, including reasonable allowance for attorneys' fees and experts' fees.

Between March 4, 2022 and March 11, 2022, five additional complaints were filed in federal district court in New York and one additional complaint was filed in federal district court in Pennsylvania, in each case by purported stockholders of the Company: (i) Miles Weiss vs. Resonant, Inc., et al., Case No. 1:22-cv-01202-FB-PK (E.D.N.Y.) (the "Weiss Complaint"), (ii) Brian Jones vs. Resonant, Inc., et al., Case No. 1:22-cv-01855 (S.D.N.Y.) (the "Jones Complaint"), (iii) Ken Callen vs. Resonant, Inc., et al., Case No. 1:22-cv-01903 (S.D.N.Y.) (the "Callen Complaint"), (iv) Thomas Valenti vs. Resonant, Inc., et al., Case No. 1:22-cv-01244 (E.D.N.Y.) (the "Valenti Complaint"), (v) Benny Ruff vs. Resonant, Inc., et al., Case No. 2:22-cv-00861(E.D. Pa.) (the "Ruff Complaint"), and (vi) Jeffrey D. Justice, II vs. Resonant Inc. et al., Case No. 1:22-cv-01353 (E.D.N.Y.) (the "Justice Complaint"). The Weiss Complaint was voluntarily dismissed by the plaintiff on March 11, 2022.

Each of the Jones Complaint, the Valenti Complaint, the Ruff Complaint and the Justice Complaint asserts claims under Sections 14(e), 14(d), and 20(a) of the Exchange Act, and Rule 14d-9 promulgated thereunder, alleging, among other things, that defendants omitted certain material facts related to the transaction from the Schedule 14D-9. The Callen Complaint, which asserts claims under Sections 14(e) and 20(a) of the Exchange Act, alleges, in addition, that the disclosure regarding the Company's financial projections is false and misleading in view of alleged prior statements by the Company on certain earnings calls. Each of the Jones Complaint, the Valenti Complaint, the Callen Complaint, the Ruff Complaint and the Justice Complaint seeks, among other things, to enjoin the defendants from consummating the transaction, rescissory damages should the transaction not be enjoined, and an award of attorneys' fees and experts' fees.

The Company and the Board believe that the allegations in each of the foregoing complaints are without merit and intend to defend their position. However, a negative outcome in any lawsuit could have a material adverse effect on the Company if it results in preliminary or permanent injunctive relief or rescission of the Merger Agreement. In addition, although the Company has directors and officers liability insurance, the Company anticipates that it will incur significant expense within its self-insured retention under that insurance. The Company is not currently able to predict the outcome of any

of the lawsuits with any certainty. Additional lawsuits may be filed against the Company, the Board of Directors or management in connection with the Merger Agreement and the Schedule 14D-9.

We are not party to any other legal proceedings. We may, from time to time, be party to litigation and subject to claims incident to the ordinary course of business. As our growth continues, we may become party to an increasing number of litigation matters and claims. The outcome of litigation and claims cannot be predicted with certainty, and the resolution of any future matters could materially affect our future financial position, results of operations or cash flows.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Market Information for Common Stock

Our common stock is listed on The Nasdaq Capital Market under the symbol "RESN".

Holders of Record

As of December 31, 2021, we had 19 holders of record of our common stock. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

Dividend Policy

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our common stock in the foreseeable future, if at all. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements, general business conditions and other factors that our board of directors may deem relevant. Under the Merger Agreement described in "Part I - Business - Merger Agreement," we are precluded from paying dividends on our common stock while that agreement remains in effect.

Recent Sales of Unregistered Securities

None.

Use of Proceeds

Not applicable.

ITEM 6. [Reserved]

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

You should read the following discussion and analysis of our financial condition and results of operations in conjunction with the consolidated financial statements and the related notes to the consolidated financial statements included later in this Annual Report on Form 10-K. In addition to historical financial information, the following discussion contains forward-looking statements that reflect our plans, estimates, beliefs and expectations that involve risks and uncertainties. Our actual results and the timing of events could differ materially from those discussed in these forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Annual Report on Form 10-K, particularly in "Risk Factors" and "Special Note Regarding Forward-Looking Statements."

Overview

We are a late-stage development company that develops technology for the RF front-end market. Our focus is on continuing to create innovative technology, engage new customers, expand the number of license contracts for filter designs and build the necessary infrastructure to support anticipated growth.

We plan to continue to develop IP associated with high frequency/high-wide bandwidth filters (XBAR®-based filters), to expand our IP and trade secret libraries, and further the development of our WaveX™ multi-physics EDA platform. During the third quarter of 2019, we completed an investment and commercial agreement with Murata Manufacturing Co., Ltd., the first collaboration agreement leveraging our XBAR® IP. During 2020 we continued the development of filters under the commercial agreement, resulting in completion of the second milestone ahead of schedule in October. This milestone is significant as it recognizes achieving predetermined target performance, packaging and initial reliability. We expanded our relationship further by entering into agreements with Murata Manufacturing Co., Ltd., for the development of additional 5G XBAR® RF filters. In all licensing arrangements with our customers we intend to retain ownership of our technology, software, designs and related improvements. Our goal is to establish and leverage alliances with new and existing customers, who will help grow the market for our designs by integrating them with their own proprietary technology and products, or by using our software products for their own designs, thus combining their own particular strengths with ours to provide an extensive array of solutions. We continue to expand our foundry program, which allows fabless companies to enter into the filter business quickly and efficiently. It is through this foundry program that we expect to engage OEM's and Independent Design House's (IDH's) directly to provide a significant cost and time to market advantage.

Our costs include employee salaries and benefits, compensation paid to consultants, capital costs for research and other equipment, costs associated with development activities including travel and administration, legal expenses, sales and marketing costs, general and administration expenses, and other costs associated with a late-stage development, publicly-traded technology company. We continue to add employees, as needed, to support the development of our WaveX™ platform, applications and system test, research and development, as well as sales, marketing and administration functions, to support our efforts.

The amounts that we actually spend for any specific purpose may vary significantly and will depend on a number of factors including, but not limited to, our expected cash resources, the pace of progress of our commercialization and development efforts, actual needs with respect to product testing, research and development, market conditions, and changes in or revisions to our marketing strategies. In addition, we may invest in complementary products, technologies or businesses.

Merger Agreement

On February 14, 2022, we entered into an Agreement and Plan of Merger (the "Merger Agreement") by and among Resonant, Murata Electronics North America, Inc., a Texas corporation ("Murata"), and PJ Cosmos Acquisition Company, Inc., a Delaware corporation and wholly owned subsidiary of Murata ("Purchaser"). Murata is a wholly-owned subsidiary of MMC.

Pursuant to the terms and subject to the conditions set forth in the Merger Agreement, on February 28, 2022 Purchaser commenced a cash tender offer (the "Offer") to purchase all of the outstanding shares of Resonant's common stock, par value $0.001 per share (the "Shares"), at a purchase price of $4.50 per Share, net to the tendering stockholder in cash, without interest and less any required withholding taxes (the "Per Share Amount"). Upon successful completion of the Offer, and subject to the terms and conditions of the Merger Agreement, Purchaser will be merged with and into Resonant (the "Merger"), and Resonant will survive the Merger as a wholly-owned subsidiary of Murata. At the effective time of the Merger (the "Effective Time"), each outstanding Share (other than Shares held by (i) Resonant, Murata or their respective subsidiaries immediately prior to the Effective Time and (ii) stockholders of Resonant who have properly and validly perfected their statutory appraisal rights under the Delaware General Corporation Law ("DGCL")) will automatically be converted into the right to receive the Per Share Amount on the terms and subject to the conditions set forth in the Merger Agreement.

The initial expiration date of the Offer is the time that is one minute following 11:59 p.m., New York City time, on March 25, 2022, subject to extension in certain circumstances as required or permitted by the Merger Agreement and applicable law. The Offer is subject to the satisfaction of customary conditions, including, among others, that (i) at least that number of Shares validly tendered and not withdrawn (other than Shares tendered by guaranteed delivery where actual delivery has not occurred), when added to any Shares already owned by Murata or any of its controlled subsidiaries, if any, equal a majority of the outstanding Shares as of immediately prior to the time at which Purchaser first accepts for payment the Shares tendered in the Offer, (ii) the expiration or termination of the applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and (iii) the other conditions set forth in Annex A to the Merger Agreement have been satisfied or waived.

The Merger Agreement contemplates that the Merger will be effected pursuant to Section 251(h) of the DGCL, which permits completion of the Merger upon the collective ownership by Murata, Purchaser and any other subsidiary of Murata of one share more than 50% of the number of Shares that are then issued and outstanding, and if the Merger is so effected pursuant to Section 251(h) of the DGCL, no stockholder vote will be required to consummate the Merger.

The Merger Agreement places limitations on Resonant's ability to engage in certain types of transactions without Murata's consent during the period between the signing of the Merger Agreement and the Effective Time. During this period, Resonant may not raise additional capital through the sale of securities or incur debt. Further, other than in transactions in the ordinary course of business or within specified dollar limits and certain other limited exceptions, Resonant generally may not acquire other businesses, make investments in other persons, or sell, lease, or encumber our assets.

The Merger Agreement contains certain termination rights for each of us and Murata. Among such rights, and subject to certain limitations, either Resonant or Murata may terminate the Merger Agreement if the Offer is not completed by June 14, 2022, which date may be extended to August 14, 2022 under certain circumstances. The Merger Agreement also provides that upon termination of the Merger Agreement under specified circumstances, we may be required to pay Murata a termination fee of $11.2 million or Murata may be required to pay us a termination fee of $15.0 million. In addition, upon termination of the Merger Agreement under specified circumstances, we may be required to reimburse Murata for up to $3.0 million of expenses. Any expenses we reimburses Murata would be offset against and reduce the amount of the termination fee otherwise payable by us to Murata.

The COVID-19 Pandemic

The ongoing COVID-19 pandemic has negatively impacted the United States, Asia and Europe, the major markets in which we operate. Although we have seen improvements in the United States, the major markets in which we operate continue to experience COVID-19 cases and recurring shutdowns. The pandemic's ultimate impact on our operations and financial performance depends in part on many factors not within our control and that vary by region, including, without limitation, restrictive governmental and business actions that continue to be taken in response (including travel restrictions and other workforce limitations).

If restrictions continue for an extended period of time, we may, among other issues, experience delays in product development, a decreased ability to support our customers, further disruptions in sales and marketing activities and an overall lack of productivity. Similarly, significant outbreaks, continued travel restrictions, stay-at-home or work remote conditions, or other restrictions may impact our customers' ability to manufacture or deliver raw materials or provide key components or services, which could result in delays in the demand from our customers to produce designs. The pandemic may also impact the expansion of current and/or the roll out of new services which could impact our customers' demand for their products, which could reduce their demand for our products or services. While we don't know and cannot quantify specific impacts, we expect we may be negatively affected if we encounter delays in our product development efforts, reductions in demand due to disruptions in the operations of our customers or their end customers, disruptions in local and global economies, volatility in the global financial markets, overall reductions in demand, or other COVID-19 ramifications.

We will continue to consider the potential impact of the COVID-19 pandemic on our business operations. Although no material impairment or other effects have been identified to date related to the COVID-19 pandemic, there is substantial uncertainty in the nature and degree of its continued effects over time. That uncertainty affects management's accounting estimates and assumptions, which could result in greater variability in a variety of areas that depend on these estimates and assumptions as additional events and information become known.

Results of Operations

Comparison of the Years Ended December 31, 2021 and 2020

Revenues. Revenues consist primarily of the recognized portion of the transaction price associated with our contracts from customers recognized over time as the obligations under the terms of the contract are satisfied. Generally, the transaction price includes both upfront and milestone payments which we expect to receive in exchange for providing services. Revenues also include royalties from shipments of our licensed designs. For the years ended December 31, 2021 and 2020, we recognized $2.2 million and $3.2 million, respectively, of revenue. We derive a substantial majority of our revenues from a major Tier 1 RF filter manufacturer. We have recorded $6.8 million of deferred revenue as of December 31, 2021, which we expect to recognize over the remainder of the contracts, generally the next four years. Additionally, we expect to continue to recognize sales-based royalty revenue from our license agreements.

Research and Development. These expenses relate to direct engineering and other costs associated with the development and commercialization of our technology, including the development of filter designs for our customers, and consist primarily of the compensation costs of employees and consultants, including stock-based compensation, and to a lesser extent development related costs for facilities, equipment, software and supplies. We also include the costs for our intellectual property development program under research and development. This program focuses on patent strategy and invention extraction.

Research and development expenses increased $3.4 million from $19.5 million in 2020 to $22.9 million in 2021. The increase was the result of higher development costs of $1.8 million related to our WaveX™ and XBAR® technology development, $0.4 million of increased legal and other expenses related to our patent strategy program, and $1.6 million increase in employment costs and compensation expense associated with headcount increases, offset by a decrease of $0.3 million of severance related to a restructuring that occurred in the first quarter of 2020. We anticipate that our research and development expenses will continue to increase due to higher development costs and additional headcount.

Sales, Marketing and Administration Expenses. These expenses relate to our sales and marketing efforts and our back-office support and include compensation costs of employees and consultants, including stock-based compensation. They also include expenses for facilities, travel expenses, telecommunications, investor relations, insurance and professional fees.

Sales, marketing and administration expenses increased $3.1 million, from $12.1 million in 2020 to $15.2 million in 2021. The increase was primarily a product of increased compensation expenses for employees and consultants of $2.0 million, increased travel expense of $0.1 million as COVID restrictions have started to lift and other increased operating expenses including insurance, investor relations, legal and accounting of $0.9 million . We anticipate that our sales, marketing and administration expenses may continue to increase as a result of anticipated growth.

Interest and Investment Income. Interest and investment income decreased from $66,000 in 2020 to zero in 2021 primarily due to decreased cash and investment balances and lower interest rates. We expect interest income to fluctuate in proportion to our cash and investment balances.

Income Taxes. We have earned minimal revenues and are currently operating at a loss. In addition to minimum taxes in the states where we conduct business, we are also responsible for income taxes in Switzerland related to the earnings of our foreign subsidiary, GVR. The provision for income taxes primarily represents the minimum taxes we incurred during the year.

Liquidity and Capital Resources

Financing Activities

We have earned minimal revenues since inception. Our operations have been funded with initial capital contributions and proceeds from the sale of equity securities and debt.

As of December 31, 2021, we have raised aggregate gross proceeds of $155.9 million through the use of loans, convertible debt and sales of equity pursuant to our initial public offering, secondary underwritten offerings, an at-the-market equity program, private placement financings, and the exercise of warrants and stock options.

We had current assets of $21.9 million and current liabilities of $7.0 million as of December 31, 2021, resulting in working capital of $14.9 million. This compares to working capital of $19.8 million as of December 31, 2020. The change in working capital is primarily the result of use of cash in our normal business operations offset by the proceeds from the issuance of equity.

As of December 31, 2021, our accumulated deficit totaled $186.9 million. In the year ended December 31, 2021 our net loss totaled $36.0 million and we used $22.1 million of cash for operating activities, the purchase of property and equipment and expenditures for patents. To date we have not generated significant revenues to enable profitability. We expect to continue to incur significant losses. These factors raise substantial doubt regarding our ability to continue as a going concern. At December 31, 2021 we had cash and cash equivalents of $21.2 million. In the absence of additional customer contracts, we

believe these cash resources, along with anticipated cash generated from existing customer contracts, will provide sufficient funding into the third quarter of 2022. We are subject to the risks and uncertainties associated with a new business. Our continuance as a going concern is dependent on future profitability. We are actively pursuing expanding our technology portfolio, increasing our revenue opportunities by completing deliverables under current customer contracts and entering into new customer contracts, and efficiently managing operations and exploring cost saving opportunities. We may not be successful in these efforts. As further described above, on February 14, 2022, the Company entered into a Merger Agreement for our proposed acquisition by Murata. If the merger is unable to be completed, we may need to seek to raise additional capital from the sale of equity securities or incurrence of indebtedness. There can be no assurance that additional financing will be available to us on acceptable terms, or at all in which case we might be forced to make substantial reductions in our operating expenses which could adversely affect our ability to implement our business plan and ultimately our viability as a company. Even if available, such capital may be dilutive to existing stockholders. The accompanying consolidated financial statements have been prepared on a going concern basis which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. The consolidated financial statements do not include any adjustments relating to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty.

The Merger Agreement for our proposed acquisition by Murata, described in the introduction to this management's discussion and analysis, places certain limitations on our use of cash and on our ability to raise capital through the sale of equity securities or incurrence of debt.

Cash Flow Analysis

Operating activities used cash of $20.1 million in 2021 and $21.6 million in 2020. The decrease is primarily the result of an increase in non-cash items, deferred revenue and salary accruals, partially offset by an increase in net loss primarily driven by an increase in operating expenses.

Investing activities used cash of $2.0 million in 2021 and $1.6 million in 2020. In both years, the cash used was a result of purchases of property and equipment and expenditures for patents.

Financing activities provided cash of $18.2 million in 2021 and $37.5 million in 2020. The cash provided in 2021 was the result of proceeds from the sales of equity securities from our at-the-market program and exercises of stock options. The cash provided in 2020 was the result of proceeds from the sales of equity securities from an underwritten public offering and from our at-the-market program.

Off-Balance Sheet Transactions

We do not have any off-balance sheet arrangements.

Contractual Obligations and Known Future Cash Requirements

Indemnification Agreements

In the ordinary course of business, we may enter into agreements of varying scope and terms pursuant to which we agree to indemnify customers, vendors, lessors, business partners and other parties with respect to certain matters, including, but not limited to, losses arising out of breach of such agreements, services to be provided by us or from intellectual property infringement claims made by third parties. In addition, we have entered into indemnification agreements with directors and certain officers and employees that will require us, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors, officers or employees. No demands have been made upon us to provide indemnification under such agreements and there are no claims that we are aware of that could have a material effect on our consolidated balance sheets, consolidated statements of comprehensive loss, consolidated statements of stockholders' equity or consolidated statements of cash flows.

Our material cash requirements include the following contractual and other obligations.

Purchasing Commitments

We have non-cancelable purchasing commitments that we incur in the ordinary course of business. The purchase commitments covered by these agreements are for less than one year and aggregate to $0.7 million as December 31, 2021.

Operating Lease Commitments

We lease various office facilities, including our corporate headquarters in Austin, Texas, as well as our offices in Goleta, California, San Mateo, California and Anyang, South Korea under operating lease agreements. The terms of the lease agreements provide for rental payments on a graduated basis. We recognize rent expense on a straight-line basis over the lease periods. As of December 31, 2021, we had operating lease payment obligations of $1.7 million, with $0.6 million payable within 12 months.

Finance Lease Commitments

We have one finance lease for lab equipment. As of December 31, 2021, we had finance lease payment obligations of $0.2 million, with $0.1 million payable within 12 months.

Critical Accounting Policies and Estimates

Our critical accounting estimates are included in our significant accounting policies as described in Note 2 of the consolidated financial statements included in Item 8, *Financial Statements and Supplemental Data*, of this Annual Report on Form 10-K. Those consolidated financial statements were prepared in accordance with accounting principles generally accepted in the United States of America. Critical accounting estimates are those that we believe are most important to the portrayal of our financial condition and results of operations. The preparation of our consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses. Our estimates are evaluated on an ongoing basis and are drawn from historical operations, current trends, future business plans and other factors that management believes are relevant at the time our consolidated financial statements are prepared. Actual results may differ from our estimates. Management believes that the following accounting estimates reflect the more significant judgments and estimates we use in preparing our consolidated financial statements.

Revenue Recognition—We recognize revenue in accordance with Financial Accounting Standards Board, or FASB, Accounting Standards Codification, or ASC, Topic 606, *Revenue from Contracts with Customers.*

Revenue is recognized upon the transfer of control of promised goods or services to the customers in an amount that reflects the consideration we expect to receive in exchange for those products or services. We are required to use estimates to determine the transaction price in the contract as well as the time over which we will satisfy the performance obligations. The determination of the transaction price may include estimates of amounts we expect to receive, including milestones that we may achieve which would result in additional payments upon achievement. These estimates are used for recognition of our revenue primarily related to upfront non-refundable fees received in connection with filter design projects with customers. Our performance obligation is to design a licensable filter in accordance with customer specifications. For the years ended December 31, 2021 and 2020, the majority of our revenue was recognized over time as services were provided. We recognize revenue over the course of the estimated design development phase based on efforts expended to date. Significant estimation is involved in determining the efforts that will be expended for the contract duration. The estimation of costs over the contract period have a material impact on the revenue we recognize over the contract period and they require significant judgement on the part of management. At the end of each reporting period, we reassess our measure of progress and adjust revenue when appropriate.

Recently Issued and Adopted Accounting Pronouncements

Recent accounting pronouncements are detailed in Note 2 of the consolidated financial statements included in Item 8,*Financial Statements and Supplemental Data*, of this Annual Report on Form 10-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not applicable.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTAL DATA

Index to Consolidated Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors
Resonant Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Resonant Inc. and subsidiaries (the Company) as of December 31, 2021 and 2020, the related consolidated statements of comprehensive loss, stockholders' equity, and cash flows for the years then ended, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the years in the two-year period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has suffered recurring losses from operations and expects to continue to incur significant losses that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a 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.

Estimation of labor costs to be incurred for the Murata contracts

As discussed in Notes 2 and 3 to the consolidated financial statements, in September 2019 the Company entered into a collaboration and license agreement with Murata Manufacturing Co., Ltd (Murata), and in September 2021 the Company entered into an addendum to this agreement with Murata. Under the Murata agreements, the Company enters individual statements of work for the design and development of products, which the Company identifies as separate contracts (the agreements and related statements of work are collectively referred to as the Murata Contracts). The Company recognizes revenue for the performance obligations in the Murata Contracts over the estimated design development period based on the level of effort expended, as measured by costs incurred relative to total expected

costs, as the services are performed. Revenue for the Murata Contracts is recognized over time and represented a substantial majority of total revenues of $2.2 million for the year ended December 31, 2021.

We identified the evaluation of the estimate of labor costs to be incurred for the Murata Contracts as a critical audit matter. Subjective auditor judgment was required to evaluate the estimates of remaining labor costs to complete the performance obligations in the Murata Contracts due to a high degree of estimation uncertainty.

The following are the primary procedures we performed to address this critical audit matter:

- we inquired of operational and financial personnel of the Company to evaluate progress to date, the estimate of remaining labor costs to be incurred, and factors impacting the amount of time and cost to complete the performance obligations in the Murata Contracts, including the assessment of the nature and complexity of the work to be performed
- we inspected correspondence, if any, between the Company and Murata as part of our evaluation of contract progress
- we compared the Company's original or prior period estimate of labor costs to be incurred to the actual labor costs incurred to-date plus the estimate of remaining labor costs to be incurred to assess the Company's ability to accurately estimate labor costs.

/s/ KPMG LLP

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

Irvine, California
March 14, 2022

RESONANT INC.
Consolidated Balance Sheets
(In thousands, except share data)

	December 31, 2021	December 31, 2020
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	$ 21,206	$ 24,968
Accounts receivable	48	208
Prepaid expenses and other current assets	636	511
Restricted cash	55	—
TOTAL CURRENT ASSETS	21,945	25,687
NONCURRENT ASSETS		
Property and equipment, net	1,306	1,583
Intangibles, net	2,639	2,119
Restricted cash	—	105
Goodwill	878	911
Operating lease right-of-use assets	1,380	2,012
Financing lease right-of-use asset	160	201
Other assets	53	112
TOTAL NONCURRENT ASSETS	6,416	7,043
TOTAL ASSETS	$ 28,361	$ 32,730
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable	$ 1,144	$ 982
Accrued expenses	308	449
Accrued salaries and payroll related expenses	3,079	1,970
Deferred revenue, current portion	1,907	1,721
Operating lease liabilities, current	525	699
Financing lease liability, current	41	30
TOTAL CURRENT LIABILITIES	7,004	5,851
LONG-TERM LIABILITIES		
Deferred revenue, net of current portion	4,889	62
Operating lease liabilities, net of current portion	1,078	1,589
Financing lease liability, net of current portion	134	175
TOTAL LIABILITIES	13,105	7,677
Commitments and contingencies (Note 11)		
STOCKHOLDERS' EQUITY		
Common stock, $0.001 par value, 100,000,000 authorized and 66,999,853 outstanding as of December 31, 2021 and 59,128,356 outstanding as of December 31, 2020	67	59
Preferred stock, $0.001 par value, 3,000,000 shares authorized and none outstanding as of December 31, 2021 and December 31, 2020	—	—
Additional paid-in capital	202,014	175,813
Accumulated other comprehensive income	51	87
Accumulated deficit	(186,876)	(150,906)
TOTAL STOCKHOLDERS' EQUITY	15,256	25,053
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 28,361	$ 32,730

See Notes to Consolidated Financial Statements

RESONANT INC.
Consolidated Statements of Comprehensive Loss
(In thousands, except per share data)

	Year Ended December 31, 2021	Year Ended December 31, 2020
REVENUES	$ 2,178	$ 3,160
OPERATING EXPENSES		
Research and development	22,935	19,477
Sales, marketing and administration	15,197	12,150
TOTAL OPERATING EXPENSES	38,132	31,627
NET OPERATING LOSS	(35,954)	(28,467)
OTHER INCOME (EXPENSE)		
Interest and investment income	—	66
Interest and other expense	(15)	(12)
TOTAL OTHER INCOME	(15)	54
LOSS BEFORE INCOME TAXES	(35,969)	(28,413)
Provision for income taxes	1	1
NET LOSS	$ (35,970)	$ (28,414)
Foreign currency translation adjustment, net of tax	$ (36)	$ 86
COMPREHENSIVE LOSS	$ (36,006)	$ (28,328)
NET LOSS PER SHARE - BASIC AND DILUTED	$ (0.58)	$ (0.55)
Weighted average shares outstanding — basic and diluted	**62,480,340**	**51,254,329**

See Notes to Consolidated Financial Statements

RESONANT INC.
Consolidated Statements of Stockholders' Equity
(In thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income	Total Stockholders' Equity
	Shares	Amount				
Balance, January 1, 2020	33,156	$ 33	$ 132,214	$ (122,492)	$ 1	$ 9,756
Vesting of restricted stock units	2,183	2	—	—	—	2
Stock-based compensation	—	—	6,166	—	—	6,166
Sales of common stock, net of offering costs	23,776	24	37,423	—	—	37,447
Exercise of warrants	7	—	—	—	—	—
Exercise of stock options	6	—	10	—	—	10
Net loss	—	—	—	(28,414)	—	(28,414)
Foreign currency translation adjustment	—	—	—	—	86	86
Balance, December 31, 2020	59,128	59	175,813	(150,906)	87	25,053
Vesting of restricted stock units	2,174	1	—	—	—	1
Stock-based compensation	—	—	7,930	—	—	7,930
Sales of common stock, net of offering costs	5,593	7	17,979	—	—	17,986
Exercise of stock options	105	—	292	—	—	292
Net loss	—	—	—	(35,970)	—	(35,970)
Foreign currency translation adjustment	—	—	—	—	(36)	(36)
Balance, December 31, 2021	67,000	$ 67	$ 202,014	$ (186,876)	$ 51	$ 15,256

See Notes to Consolidated Financial Statements

RESONANT INC.
Consolidated Statements of Cash Flows
(In thousands)

	Year Ended December 31, 2021	Year Ended December 31, 2020
CASH FLOWS FROM OPERATING ACTIVITIES		
Net loss	$ (35,970)	$ (28,414)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	900	1,000
Stock-based compensation	7,954	5,824
Patent write-offs	641	383
Other	1	6
Operating lease right-of-use asset amortization	632	602
Finance lease right-of-use asset amortization	41	—
Changes in assets and liabilities:		
Accounts receivable	160	(130)
Prepaids and other current assets	(125)	(134)
Other assets	59	(44)
Accounts payable	298	(245)
Accrued expenses	(106)	19
Accrued salaries and payroll related expenses	1,085	(55)
Operating lease liabilities	(685)	(501)
Deferred revenue	5,013	52
Net cash used in operating activities	(20,102)	(21,637)
CASH FLOWS FROM INVESTING ACTIVITIES		
Purchases of property and equipment	(707)	(705)
Expenditures for patents	(1,254)	(881)
Net cash used in investing activities	(1,961)	(1,586)
CASH FLOWS FROM FINANCING ACTIVITIES		
Gross proceeds from the sale of common stock	18,614	40,173
Offering costs in connection with the sale of common stock	(628)	(2,726)
Principal payments on finance lease	(30)	—
Proceeds from exercises of stock options	293	10
Net cash provided by financing activities	18,249	37,457
Effects of currency translation on cash, cash equivalents and restricted cash	2	1
NET INCREASE IN CASH, CASH EQUIVALENTS AND RESTRICTED CASH	(3,812)	14,235
CASH, CASH EQUIVALENTS AND RESTRICTED CASH — Beginning of year	25,073	10,838
CASH, CASH EQUIVALENTS AND RESTRICTED CASH — End of year	$ 21,261	$ 25,073
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION		
Cash paid for taxes	$ 1	$ 2
Cash paid for interest	$ 7	$ —
SUPPLEMENTAL DISCLOSURE OF NON-CASH ACTIVITIES		
Common stock issued in settlement of accrued salaries and payroll related expenses	$ 442	$ 343
Property and equipment included in accounts payable	$ 67	$ 193
Property and equipment included in accrued expenses	$ 33	$ 68
Patents included in accounts payable	$ 210	$ 224
Finance lease liability included in accounts payable	$ 4	$ —
Property acquired through finance lease obligation	$ —	$ 204
Operating lease assets obtained in exchange for new lease liabilities	$ —	$ 114

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the Consolidated Balance Sheets to the total of the same such amounts shown above (in thousands):

	December 31,	
	2021	2020
Cash and cash equivalents	$ 21,206	$ 24,968
Restricted cash	55	105
Total cash, cash equivalents and restricted cash	$ 21,261	$ 25,073

See Notes to Consolidated Financial Statements

RESONANT INC.
Notes to Consolidated Financial Statements

NOTE 1—ORGANIZATION AND DESCRIPTION OF BUSINESS

Overview

Resonant Inc. is a late-stage development company located in Austin, Texas, with offices in Goleta, California, San Mateo, California and Anyang, South Korea. We were incorporated in Delaware in January 2012 as a wholly owned subsidiary of Superconductor Technologies Inc., or STI. Resonant LLC, a limited liability company, was formed in California in May 2012. We changed our form of ownership from a limited liability company to a corporation in an exchange transaction in June 2013, when we commenced business. We are the successor of Resonant LLC. We completed our initial public offering, or IPO, on May 29, 2014. On July 6, 2016 we acquired all of the issued and outstanding capital stock of GVR Trade S.A, or GVR. GVR is a wholly owned subsidiary of Resonant Inc. The company operates in one market and segment, the radio frequency filter design industry.

The innovative software platform we continue to develop is based on fundamentally new technology that we call WaveX™, to configure and connect resonators, the building blocks of RF filters. Currently, we are leveraging WaveX™ to develop designs targeted for either the Surface Acoustic Wave (SAW) or Temperature Compensated, Surface Acoustic Wave (TC-SAW) manufacturing processes. We also enabled WaveX™ for BAW designs, which has resulted in our invention of a novel resonator structure based on a combination of interdigital transducer (IDT) and piezoelectric layer, XBAR®, which exhibits performance parameters suitable for 5G,5-7GHz WiFi and UWB applications - high frequency operation, large bandwidth and high power reliability.

Using WaveX™ we have developed an IP portfolio of more than415 patents filed or issued, with more than 265 filed or issued targeting XBAR®, 5G and high frequency WiFi applications. In addition, with continued requirements for increasing numbers of filter designs our innovative software platform addresses the need for increased designer efficiency, reduced time to market and lower unit costs in the designs of filters for radio frequency, or RF Front-Ends for the mobile device, Customer Premise Equipment (CPE) and Infrastructure industries. The RF Front-End, or RFFE, is the circuitry responsible for analog signal processing and is located between the device's antenna and its digital circuitry. Filters are a critical component of the RFFE used to select desired radio frequency signals and reject unwanted signals.

We believe licensing our designs is the most direct and effective means of validating our IP and IP related libraries and demonstrating the power and accuracy of our WaveX™ multi-physics EDA platform. Our target customers make part, or all of, the RFFE. We intend to retain ownership of our IP, trade secrets and designs, and we expect to be compensated through license fees and royalties either prepaid at contract inception or based on sales of RFFE filters that incorporate our IP, trade secrets and designs.

Capital Resources and Liquidity

As of December 31, 2021, our accumulated deficit totaled $186.9 million. In the year ended December 31, 2021 our net loss totaled $36.0 million and we used $22.1 million of cash and investments for operating activities, the purchase of property and equipment and expenditures for patents. To date we have not generated significant revenues to enable profitability. We expect to continue to incur significant losses. These factors raise substantial doubt regarding our ability to continue as a going concern. At December 31, 2021 we had cash and cash equivalents of $21.2 million. In the absence of additional customer contracts, we project these cash resources, along with anticipated cash generated from existing customer contracts, will provide sufficient funding into the third quarter of 2022. We are subject to the risks and uncertainties associated with a new business. Our continuance as a going concern is dependent on future profitability. We are actively pursuing expanding our technology portfolio, increasing our revenue opportunities by completing deliverables under current customer contracts and entering into new customer contracts, and efficiently managing operations and exploring cost saving opportunities. We may not be successful in these efforts. As further described in Note 15 - Subsequent Events, on February 14, 2022 we entered into a Merger Agreement for our proposed acquisition by Murata. If the merger is unable to be completed, we may need to seek to raise additional capital from the sale of equity securities or incurrence of indebtedness. There can be no assurance that additional financing will be available to us on acceptable terms, or at all in which case we might be forced to make substantial reductions in our operating expenses which could adversely affect our ability to implement our business plan and ultimately our viability as a company. Even if available, such capital may be dilutive to existing stockholders. The accompanying consolidated financial statements have been prepared on a going concern basis which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. The consolidated financial statements do not include any adjustments relating to the recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might result from the outcome of this uncertainty.

NOTE 2—SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation and Use of Estimates—The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in the United States, or U.S. GAAP. Significant estimates made in preparing these financial statements include (a) assumptions to calculate the fair values of financial instruments, warrants and equity instruments and other liabilities and the deferred tax asset valuation allowance; (b) the useful lives for depreciable and amortizable assets and (c) the estimated efforts to be expended, as well as our ability to achieve milestones, in connection with our revenue contracts. Actual results could differ from those estimates. Additionally, the global economic effects resulting from the COVID-19 pandemic may cause changes to estimates that would have a material impact on our financial statements, particularly with respect to timing of revenue recognition due to delays in meeting our performance obligations. As of the date of issuance of these financial statements, our results of operations have not been significantly impacted by the COVID-19 pandemic, however, we continue to monitor the situation. In the opinion of management, all adjustments, including normal recurring accruals considered necessary for a fair presentation, have been included.

Consolidation - The accompanying financial statements include the accounts of the Company and its wholly-owned subsidiary, GVR. All significant intercompany balances and transactions have been eliminated.

Cash and Cash Equivalents—We consider all liquid instruments purchased with a maturity of three months or less to be cash equivalents.

Concentration of Credit Risk—We maintain bank accounts atone U.S. financial institution. The U.S. bank accounts are insured by the Federal Deposit Insurance Corporation (FDIC) for up to $250,000 per account owner. GVR, our wholly owned Swiss-based subsidiary maintains checking accounts at one major national financial institution. Additionally, we maintain a checking account with a very minimal balance at one bank in South Korea, which is used to fund payroll and rent in South Korea. Management believes we are not exposed to significant credit risk due to the financial position of the depository institutions in which our deposits are held.

Restricted Cash—Restricted cash at December 31, 2021 and 2020 consists of a pledged mutual fund account which is held as collateral against a letter of credit issued in May 2018 in connection with the lease of our offices in Goleta, California. The letter of credit was reissued in November 2020 due to a change in the property owner. No changes were made to the terms of the letter of credit. The terms of the letter of credit allow for a step-down of $50,000 annually upon performance of certain events, primarily no late or defaulted payments. See also Note 9 - Leases, for further details.

Fair Value of Financial Instruments—We measure certain financial assets and liabilities at fair value based on the exit price notion, or price that would be received for an asset or paid to transfer a liability, in an orderly transaction between the market participants at the measurement date. The carrying amounts of our financial instruments, including cash equivalents, restricted cash, accounts receivable, accounts payable, and accrued liabilities, approximate fair value due to their short maturities.

Accounts Receivable—Trade accounts receivable are stated net of allowances for doubtful accounts. Management estimates the allowance for doubtful accounts based on review and analysis of specific customer balances that may not be collectible, customer payment history and any other customer-specific information that may impact collectability of the receivable. Accounts are considered for write-off when they become past due and when it is determined that the probability of collection is remote. There was no allowance for doubtful accounts at December 31, 2021 and 2020.

Property and Equipment—Property and equipment consists of leasehold improvements associated with our corporate offices, software purchased during the normal course of business, equipment and office furniture and fixtures, all of which are recorded at cost. Depreciation and amortization is recorded using the straight-line method over the respective useful lives of the assets ranging from two to five years. Leasehold improvements are amortized over the shorter of lease term or useful life. Long-lived assets are reviewed for impairment whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable.

Intangible Assets, net—Intangible assets are recorded at cost and amortized over the useful life. In the case of business combinations, intangible assets are recorded at fair value. At December 31, 2021 and 2020, intangible assets, net, includes patents and a domain name and other intangible assets purchased as part of our acquisition of GVR, including customer relationships, technology and a trademark. We capitalize certain patent filing costs up to the point of issuance and then amortize the cost over the life of the patent. Costs associated with maintenance or renewal of existing patents are expensed as incurred. Intangible assets are reviewed for impairment whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable. In certain cases, patents may expire or be abandoned as they no longer have a probable economic

value. In such cases we write off the capitalized patent costs as patent abandonment costs which are included in research and development expenses.

Goodwill—Goodwill represents the difference between the price paid to acquire GVR and the fair value of the assets acquired, net of assumed liabilities. We review goodwill for impairment annually and whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable.

Revenue Recognition—Revenue is recognized upon the transfer of control of promised goods or services to customers, generally over time, in an amount that reflects the consideration we expect to receive in exchange for those products or services. Revenue consists primarily of the recognized portion of up-front, non-refundable, prepaid royalties received in connection with filter design projects with customers. Our performance obligations include material rights of the customer for future designs and also current obligations to design a licensable filter in accordance with customer specifications. The license of any completed design is considered part of the performance obligation as the design and licensing of the filter are highly interdependent. We recognize revenue from our design services based on efforts expended to date. At the end of each reporting period, we reassess our measure of progress and adjust revenue when appropriate. We record the expenses related to these projects in the periods incurred and they are included in research and development expense.

We evaluate upfront non-refundable prepaid royalties associated with design development contracts to determine whether any of the prepaid amount is attributable to a material right of the customer, or if the payment is solely attributable to the current design contract. If a material right exists, then the upfront payment may require allocation of the amount between the amount attributable to the material right and the amount attributable to the current design contract. In cases that require allocation, we use estimated stand-alone selling prices, as well as other factors, to make the allocation. Amounts attributable to the material right of the customer are initially deferred and then once a design contract is entered into, they are combined with other payments in the contract and are considered the full transaction price for the contract. Upfront non-refundable prepaid royalties attributed to a design contract are generally recognized over a multi-year period of one to four years as that is the amount of time it generally takes us to develop a design; however, the actual amount of time depends on the complexity of the filter being designed. Contracts may also include milestone payments based upon the successful completion of certain deliverables. Milestone payments represent variable consideration, and we use the "most likely amount" approach to determine the amount we ultimately expect to receive.

Upon completion of design services, our customers retain a license over the completed design. The license will typically last for a minimum of two years, and in many cases for the life of the design. Some contracts also include royalties that are sales-based, and we recognize royalty revenue upon shipment, by our customer, of products that include our licensed design. Payment is generally due within 30 days.

We apply the exemptions available in ASC 606 to not disclose information about 1) remaining performance obligations that have original expected durations of one year or less and 2) variable consideration that is a sales-based or usage-based royalty. Our performance obligations related to material rights of the customer are expected to be performed in more than one year as the customer has discretion over the timing of entering into additional contracts.

Research and Development—Costs and expenses that can be clearly identified as research and development are charged to expense as incurred in accordance with ASC Topic 730-10, *Research and Development*.

Operating Leases—We lease office space and research facilities under operating leases. Certain lease agreements contain free or escalating rent payment provisions.

We determine if an arrangement is a lease at lease inception. Operating leases are included in right-of-use (“ROU”) lease assets, other current liabilities (current portion of lease obligations), and long term lease obligations on our balance sheets. ROU lease assets represent our right to use an underlying asset for the lease term and lease obligations represent our obligation to make lease payments arising from the lease. Operating ROU lease assets and obligations are recognized at the commencement date based on the present value of lease payments over the lease term. As most of our leases do not provide an implicit rate, we use an incremental borrowing rate based on the information available at the commencement date in determining the present value of lease payments. The ROU lease asset also includes any lease payments made and excludes lease incentives. We evaluate renewal options at lease inception and on an ongoing basis, and include renewal options which we are reasonably certain to exercise in our expected lease term when classifying leases and measuring lease liabilities. We allocate the consideration between lease and non-lease components and exclude non-lease components from our recognized lease assets and liabilities.

Minimum lease payments, including scheduled rent increases, are recognized as lease expenses on a straight-line basis over the applicable lease term. We recognize lease expenses within research and development and sales, marketing and administration expenses on a straight-line basis over the lease term.

We are not party to any leases for which we are the lessor.

Finance Lease—The finance lease right-of-use asset represents our right to use an underlying asset for the lease term and the finance lease liability represents the present value of lease payments not yet paid. Interest expense on the finance lease is recorded over the lease term and is presented in interest expense, based on the effective interest method. The right-of-use asset is amortized over the term of the related lease.

Stock-Based Compensation—We account for employee stock options in accordance with ASC Topic 718,*Compensation-Stock Compensation.* We use the Black-Scholes option valuation model for estimating fair value at the date of grant.

We account for restricted stock units issued at fair value, based on the market price of our stock on the date of grant. Compensation expense is recognized for the portion of the award that is ultimately expected to vest over the period during which the recipient renders the required services to the Company generally using the straight-line single option method.

We recognize compensation expense for restricted stock units with market conditions using a graded vesting model, based on the probability of the market condition being met.

In the case of award modifications, we recognize the effect of the modification in the period the award is modified.

Stock-based compensation expense is included in research and development expenses and general and administrative expenses.

Earnings Per Share, or EPS—EPS is computed in accordance with ASC Topic 260,*Earnings per Share*, and is calculated using the weighted average number of common shares outstanding during each period. Diluted EPS assumes the conversion, exercise or issuance of all potential common stock equivalents unless the effect is to reduce a loss or increase the income per share. Potential common shares consist of the incremental common shares issuable upon the exercise of stock options (using the treasury stock method), the exercise of warrants (using the if-converted method) and the vesting of restricted stock unit awards.

Income Taxes—We account for income taxes in accordance with ASC Topic 740,*Income Taxes*, or ASC 740, which requires the recognition of deferred tax assets and liabilities for the future consequences of events that have been recognized in our consolidated financial statements or tax returns. The measurement of the deferred items is based on enacted tax laws. In the event the future consequences of differences between financial reporting bases and the tax bases of our assets and liabilities result in a deferred tax asset, ASC 740 requires an evaluation of the probability of being able to realize the future benefits indicated by such asset. A valuation allowance related to a deferred tax asset is recorded when it is more likely than not that some portion or the entire deferred tax asset will not be realized. As part of the process of preparing our consolidated financial statements, we are required to estimate our income tax expense in each of the jurisdictions in which we operate. We also assess temporary differences resulting from differing treatment of items for tax and accounting differences. We record a valuation allowance to reduce the deferred tax assets to the amount of future tax benefit that is more likely than not to be realized.

Foreign Currency Translation—The Swiss Franc has been determined to be the functional currency for the net assets of our Swiss-based subsidiary. We translate the assets and liabilities to U.S. dollars at each reporting period using exchange rates in effect at the balance sheet date and record the effects of the foreign currency translation in accumulated other comprehensive loss in shareholders' equity. We translate the income and expenses to U.S. dollars at each reporting period using the average exchange rate in effect for the period and record the effects of the foreign currency translation as other comprehensive income (loss) in the consolidated statements of comprehensive loss. Gains and losses resulting from foreign currency transactions are included in net loss in the consolidated statements of comprehensive loss.

Recent Accounting Pronouncements

Credit Losses—In June 2016, the FASB issued ASU No. 2016-13,*Financial Instruments- Credit Losses (Topic 326).* In April and November 2019, and February 2020, the FASB issued implementation amendments to the June 2016 ASU (collectively, the amended guidance). The amended guidance replaced the current incurred loss methodology for credit losses with a current expected credit loss ("CECL") model, which requires the measurement of all expected credit losses for financial assets held at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. The amended guidance expanded the information that an entity must consider in developing its expected credit loss estimates. Additionally, the updates amended the accounting for credit losses for purchased financial assets with a more-than-significant amount of credit deterioration since origination. The amended guidance requires enhanced disclosures to help investors and other financial statement users better understand significant estimates and judgments used in estimated credit losses. Early

adoption is permitted. The guidance is effective for us in January 2023. We have no plan to early adopt the guidance and are currently evaluating the impact, which we believe will be immaterial to our consolidated financial statements.

With the exception of the new standards discussed above, there have been no other new accounting pronouncements that have significance, or potential significance, to our consolidated financial statements.

NOTE 3—REVENUE RECOGNITION

Contract Liabilities - Our contract liabilities consist of deferred revenue, which represents the revenue associated with remaining performance obligations within our customer contracts. We classify contract liabilities as current or long-term based on the timing of the remaining performance obligations. Our contract liabilities are expected to be recognized over various periods of generally one to four years, but could be longer as certain performance obligations surrounding material rights of the customer are at the discretion of the customer. Deferred revenue, current and long-term, is separately stated in our consolidated balance sheets.

Summary of changes in contract liabilities for the years ended December 31, 2021 and 2020 (in thousands):

	2021	2020
Contract liabilities		
Contract liabilities, beginning	$ 1,783	$ 1,731
Recognition of revenue included in beginning of year contract liabilities	(1,475)	(1,720)
Contract liabilities, net of revenue recognized on contracts during the period	6,688	1,772
Reversal of contract liabilities due to changes in transaction price	(200)	—
Contract liabilities, ending	$ 6,796	$ 1,783

We derive a substantial majority of our revenue from a single customer. Effective September 30, 2019 we entered into a collaboration and license agreement with Murata Manufacturing Co., Ltd. (Murata). Pursuant to the collaboration agreement, we have agreed with Murata to collaborate on the development of proprietary circuit designs using our XBAR® technology, and we licensed to Murata rights for products in four specific radio frequencies, or bands. Murata has agreed to pay us up to an aggregate of $9.0 million of total contract consideration in the form of pre-paid royalties for the licensed designs and certain other intellectual property developed in the collaboration, payable in installments over a multi-year development period, with each installment conditional upon our achievement of certain milestones and deliverables acceptable to Murata in its discretion. Murata may terminate the collaboration agreement at any time upon thirty (30) days prior written notice to us.

Murata's rights to our XBAR® technology are exclusive for a period of30 months, through March 2022, during which period we may not grant to any third party the right to develop, make, have made, use, sell, offer for sale or import any filter or resonator produced through the use of the XBAR® technology for use in mobile communication devices.

Under the collaboration agreement, the first payment of $2.0 million was a non-refundable upfront payment received on October 11, 2019. The second payment of $2.5 million was received on September 29, 2020 upon the achievement of the second milestone. As of December 31, 2021 there is $4.5 million remaining potential contract consideration for the achievement of certain milestones outlined in the collaboration and license agreement.

On September 30, 2021, we entered into Addendum 1 to the collaboration agreement with Murata, which amends and supplements the collaboration agreement to provide for the development of XBAR®-based designs for up to four additional bands. For rights to these additional bands, Murata has agreed to pay us a $4.0 million non-refundable upfront payment, which was paid on November 10, 2021, and up to an aggregate of between $8.0 million and $36.0 million in pre-paid royalties and other fees, with the amount of the aggregate payments determined based on the complexity of the filter designs selected for development. The future payments will be made in two installments per band over a multi-year development period, with each installment conditional upon our achievement of certain milestones and deliverables acceptable to Murata in its discretion. Murata retains the right to terminate the collaboration agreement and addendum at any time upon thirty (30) days prior written notice to us. We evaluated whether or not Addendum 1 should be treated as a contract modification and we determined that Addendum 1 represented a separate contract and is not a modification to the existing contract. We also considered whether Addendum 1 provided material rights of the customer for future designs and determined that the customer does have material rights to enter into future design development contracts. We allocated the $4.0 million non-refundable upfront payment to each of the four bands at $1.0 million per band as the prepayment provides Murata with a material right to receive future services. Addendum 1 allows Murata with certain time periods in which to choose the next design. Once a design is chosen, the amount

of time to complete the design can be up to three years but is highly dependent on the complexity of the chosen design. We entered into a contract for the first of the four designs in October 2021. Addendum 1 allows Murata to choose the second design no later than March 2022, the third design no later than December 2022 and the fourth design no later than March 2023.

Under the Murata agreements, we enter into individual statements of work for the designs, each of which have been identified as separate contracts. On October 31, 2021, Murata entered into the first statement of work under Addendum 1 for a total transaction price of $7.0 million. The first non-refundable upfront installment payment of $3.0 million related to this agreement was received on November 10, 2021.

In accordance with the guidance of ASC 606, we are required to evaluate the variable consideration within the contract, primarily the milestone payments, and assess the likelihood of achievement in determining our transaction price. Additionally, we must assess whether the variable consideration is constrained and whether recording such variable revenue may result in a significant reversal of revenue due to uncertainties. We continue to evaluate variable consideration for inclusion in the transaction price, and ultimately the revenue recognized, at each reporting period. We recognize revenue for the performance obligations in the Murata contracts over the estimated design development period based on the level of effort expended, as measured by costs incurred relative to total expected costs, as the services are performed. For the periods ended December 31, 2021 and 2020, we have determined that the milestone payments due upon achievement of certain performance criteria are constrained and are thus not included in the transaction price. Therefore, revenue related to those milestone payments has not been recognized. Revenue recognition related to each milestone payment will commence once the constraint is lifted. Consequently, revenue recognition related to the Murata contract will vary from quarter to quarter. During the years ended December 31, 2021 and 2020, we recognized $1.6 million and $2.7 million, respectively, of revenue related to the Murata contracts.

For the years ended December 31, 2021 and 2020, the majority of our revenue was recognized over time as services were provided. At December 31, 2021, deferred revenue totaled $6.8 million and will be recognized over the balance of the respective contracts, which is generally the next four years.

NOTE 4—PROPERTY AND EQUIPMENT, NET

Property and equipment, net, consists of the following as of December 31, 2021 and 2020 (in thousands):

	2021	2020
Cost:		
Computers, peripheral and scientific equipment	$ 2,331	$ 1,841
Software	2,307	2,307
Leasehold improvements	348	310
Office furniture and equipment	434	434
	5,420	4,892
Less: Accumulated depreciation and amortization	(4,114)	(3,309)
Property and equipment, net	$ 1,306	$ 1,583

Depreciation for the years ended December 31, 2021 and 2020 was $821,000 and $904,000, respectively. Cost basis of assets disposed for the years ended December 31, 2021 and 2020 was $16,000 and $233,000, respectively.

NOTE 5—INTANGIBLE ASSETS, NET, AND GOODWILL

Intangible assets include patent filing costs and other assets (domain name and other intangibles purchased from GVR, including customer relationships, technology and a trademark). Some of the patents were acquired from Superconductor Technologies Inc. as a result of an asset contribution and were recorded at their carryover basis of $216,000 and are being amortized over the remaining useful life of approximately one year as of December 31, 2021. Intangibles acquired as part of the purchase of GVR were initially recorded at their fair value and have been fully amortized. Patent filing costs related to issued patents are amortized over the estimated life of the patent, 11 to 20 years, once they are approved by their respective regulatory agency. There are $1.8 million of pre-issued patent costs not subject to amortization as of December 31, 2021. The domain name is being amortized over the approximate useful life of 10 years.

Intangible assets, net, consists of the following as of December 31, 2021 and 2020 (in thousands):

	2021	2020
Cost:		
Patents	$ 2,738	$ 2,399
Other [1]	284	291
	3,022	2,690
Less: Accumulated amortization	(383)	(571)
Intangible assets, net	$ 2,639	$ 2,119

(1) Includes the impact of foreign currency translation. The total impact at December 31, 2021 and 2020 was $7,000 and $17,000, respectively.

During the year ended December 31, 2021 and 2020, we expensed $641,000 and $383,000, respectively, related to patents we either abandoned or wrote off as the technology is no longer supported by our current technology. The expense is included in research and development expense.

Amortization of intangible assets was $79,000 and $96,000 for the years ended December 31, 2021 and 2020, respectively. The following table summarizes the estimated amortization expense relating to the intangible assets as of December 31, 2021 (in thousands):

Years ending December 31,	
2022	$ 53
2023	52
2024	50
2025	50
2026	50
2027 and thereafter	561
Total amortization expense	$ 816

Goodwill represents the excess of the purchase price over the fair value of the net assets acquired from GVR Trade. Goodwill is not amortized, but is subject to impairment tests on at least an annual basis and whenever circumstances suggest that goodwill may be impaired.

The change in the carrying amount of goodwill are as follows (in thousands):

	Goodwill
Balance, January 1, 2020	$ 831
Effect of currency translation	80
Balance, December 31, 2020	$ 911
Effect of currency translation	(33)
Balance, December 31, 2021	$ 878

NOTE 6—WARRANTS

From time to time, we have issued warrants to purchase shares of common stock. These warrants have been issued in connection with financing transactions and for consulting services. Our warrants are subject to standard anti-dilution provisions applicable to shares of our common stock.

Consulting Warrant and Financing Warrant

Upon consummation of our Senior Convertible Note financing in June 2013, we issued warrants for business consulting services provided by MDB Capital Group, LLC, or MDB. We issued a 7-year warrant to purchase 222,222 shares of our common stock at an exercise price of $0.01 per share, which we refer to as the Consulting Warrant. The Consulting Warrant

was exercisable six months after the completion of our initial public offering, or IPO, in 2014 and expired June 17, 2020. The warrants were exercised at various dates between January 2015 and June 2020.

In addition, for placement agent services provided by MDB in connection with our Senior Convertible Note financing, we issued to MDB a 7-year warrant to purchase 208,763 shares of our common stock at an exercise price of $3.35 per share, which we refer to as the Financing Warrant. The Financing Warrant was exercisable six months after the completion of our IPO and expired June 17, 2020. There were a total of 146,233 warrants exercised between February 2015 and November 2017 and 62,530 warrants expired unexercised on June 17, 2020.

Private Placement Warrants - September 2017

In September and October 2017, we issued warrants to purchase an aggregate of 1,976,919 shares of our common stock at an exercise price of $4.85 in connection with our private placement sale of 1,976,919 shares of common stock. The sale was completed in two tranches with the first tranche, which closed on September 28, 2017, including 1,745,581 warrants, and the second tranche, which closed on October 2, 2017, including 231,338 warrants. Collectively, we refer to these warrants as Private Placement Warrants - September 2017. The warrants were exercisable for a period commencing 6 months after the closing of the financing and ending on September 28, 2020. There were 10,600 warrants exercised in June 2018, 5,319 warrants cancelled in August 2020 and 1,961,000 warrants which expired unexercised on September 28, 2020.

Placement Agent Warrants - 2017

In addition to the Private Placement Warrants - September 2017 issued in connection with our private placement sale of 1,976,919 shares of our common stock, we also issued to the placement agent, warrants to purchase a total of 98,846 shares of our common stock at an exercise price of $4.85 per share. Upon closing of the first tranche on September 28, 2017, we issued 87,279 warrants, and upon closing the second tranche, we issued 11,567 warrants. Collectively, we refer to these warrants as Placement Agent Warrants - 2017. The warrants were exercisable for a period commencing 6 months after the closing of the financing and expired, unexercised, on September 28, 2020.

A roll-forward of warrant activity from January 1, 2020 to December 31, 2020 is shown in the following table:

	Issued and Outstanding Warrants as of January 1, 2020	Warrants Exercised/ Expired	Issued and Outstanding Warrants as of December 31, 2020
Consulting Warrant	6,667	(6,667) (1)	—
Financing Warrant	62,530	(62,530) (2)	—
Private Placement Warrants - September 2017	1,966,319	(1,966,319) (3)	—
Placement Agent Warrants - 2017	98,846	(98,846) (4)	—
	2,134,362	(2,134,362)	—

(1) During the year ended December 31, 2020, there were 6,667 warrants that were exercised through a cashless exercise which netted 6,640 shares being issued.

(2) During the year ended December 31, 2020, there were 62,530 warrants that expired.

(3) During the year ended December 31, 2020, there were 5,319 warrants that were cancelled and 1,961,000 warrants that expired.

(4) During the year ended December 31, 2020, there were 98,846 warrants that expired.

There were no issued or outstanding warrants for the year ended December 31, 2021.

NOTE 7—STOCKHOLDERS' EQUITY AND EARNINGS PER SHARE

Common Stock

Pursuant to our amended and restated certificate of incorporation, we are authorized to issue 100,000,000 shares of common stock. Holders of our common stock are entitled to dividends as and when declared by the board of directors, subject to rights and holders of all classes of stock outstanding having priority rights to dividends. There have been no dividends declared to date. Each share of common stock is entitled to one vote.

On February 6, 2020, we entered into an underwriting agreement relating to an underwritten public offering of 16,666,667 shares of the Company's common stock, $0.001 par value, at an offering price to the public of $1.50 per share. Pursuant to the underwriting agreement, the Company granted the underwriters a 30-day option to purchase up to an additional 2,500,000 shares of common stock on the same terms and conditions. The underwriters exercised their option with respect to all 2,500,000 additional shares on February 10, 2020. We consummated the sale of an aggregate of 19,166,667 shares of our common stock, including the 2,500,000 shares subject to the underwriters' over-allotment option, on February 11, 2020. We received gross proceeds of approximately $28.8 million, including $201,000 for 134,000 shares purchased by Park City Capital, a significant shareholder. Net proceeds of approximately $26.4 million after deducting the underwriting discount and expenses paid by us.

On August 14, 2020, we entered into an At-The-Market Equity Offering Sales Agreement pursuant to which we may offer and sell shares of our common stock from time to time (the "ATM equity program"). We initially registered the offer and sale of up to $25.0 million of our common stock under the ATM equity program in August 2020. In May 2021, we registered an additional $50.0 million of our common stock under the ATM equity program. During 2020 we sold an aggregate of 4,609,701 shares of common stock under the ATM equity program at an average price of $2.48 per share, for gross proceeds of $11.4 million and net proceeds of $11.0 million. During 2021 we sold an aggregate of 5,592,570 shares of common stock under the ATM equity program at an average price of $3.33 per share for gross proceeds of $18.6 million and net proceeds of $18.1 million. Offering costs, including commissions and other expenses, are reflected in net proceeds.

Preferred Stock

Pursuant to our amended and restated certificate of incorporation, we are authorized to issue 3,000,000 shares of preferred stock. The board of directors has the authority, without action by our stockholders, to designate and issue shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. To-date, no preferred shares have been issued.

Earnings Per Share

The following table presents the number of shares excluded from the calculation of diluted net loss per share attributable to common stockholders as of December 31, 2021 and 2020:

	2021	2020
Common stock options	945,076	1,140,975
Non-vested restricted stock units	3,426,628	3,038,785
Total shares excluded from net loss per share attributable to common stockholders	4,371,704	4,179,760

NOTE 8— STOCK-BASED COMPENSATION

2014 Omnibus Incentive Plan

In January 2014, our board of directors approved the 2014 Omnibus Incentive Plan and amended and restated the plan in March 2014. Our stockholders approved the Amended and Restated 2014 Omnibus Incentive Plan, or the 2014 Plan, in March 2014. Our 2014 Plan initially permitted the issuance of equity-based instruments covering up to a total of 1,400,000 shares of common stock. Our board of directors and stockholders approved an increase of 1,300,000 shares in June 2016, an additional increase of 3,250,000 shares in June 2017, an additional increase of 4,000,000 shares in June 2019 and an additional

increase of 5,000,000 shares in June 2020, bringing the total shares allowed under the plan to 14,950,000. As of December 31, 2021, there were 3,259,944 shares available to issue under the 2014 Plan.

Stock Options

Options granted in 2021 and 2020 have a term of ten years and vest quarterly over sixteen quarters. The options granted in 2021 had an aggregate grant date fair value of $20,000 and options granted in 2020 had an aggregate grant date fair value of $177,000 utilizing the Black-Scholes option valuation model.

We estimated the fair value of stock options awarded during the years ended December 31, 2021 and 2020 using the Black-Scholes option valuation model. The fair values of stock options granted for the years were estimated using the following assumptions:

	Option Grants Awarded During the Year Ended December 31, 2021	Option Grants Awarded During the Year Ended December 31, 2020
Stock Price	$5.31	$1.74 to $2.85
Dividend Yield	0%	0%
Expected Volatility	88%	70% to 83%
Risk-free interest rate	0.72%	0.36% to 1.52%
Expected Term	7 years	7 years

Stock-based compensation expense related to stock options was $166,000 and $236,000 for the years ended December 31, 2021 and 2020, respectively. Beginning January 1, 2021, we recognize forfeitures as they occur. For the year ended December 31, 2020, we applied a forfeiture rate of ten percent, which is reflected in our stock-based compensation expense related to stock options.

Stock Option Award Activity

The following is a summary of our stock option activity during the year ended December 31, 2021:

	Number of Options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value	Weighted Average Remaining Life In Years
Outstanding, January 1, 2021	1,140,975	$ 4.46	$ 2.81	5.69
Granted	5,000	5.31	4.04	9.04
Exercised	(105,098)	2.79	1.69	—
Canceled/Forfeited	(95,801)	4.90	3.02	—
Outstanding, December 31, 2021	945,076	$ 4.60	$ 2.92	4.68

	Number of Options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value	Weighted Average Remaining Life In Years
Exercisable, January 1, 2021	955,302	$ 4.74	$ 2.96	5.10
Vested	74,198	3.44	2.32	6.66
Exercised	(105,098)	2.79	1.69	—
Canceled/Forfeited	(75,192)	5.55	3.35	—
Exercisable, December 31, 2021	849,210	$ 4.79	$ 3.02	4.32

As of December 31, 2021 there were 95,866 unvested stock options with a weighted average grant date fair value of $2.03.

The weighted-average grant date fair value per share of employee stock options granted during the year ended December 31, 2020 was $1.68. As of December 31, 2020 there were 185,673 unvested stock options with a grant date fair value of $2.05.

As of December 31, 2021, there was $162,000 of unrecognized compensation expense related to unvested stock options, which is expected to be recognized over a weighted average vesting period of approximately 1.8 years. Both the aggregate intrinsic value of outstanding options and options exercisable as of December 31, 2021 was zero, as there were no options whose exercise price was less than the closing fair market value of our common stock of $1.71 per share. The total intrinsic value of options exercised in the year ended December 31, 2021 was $374,000. The aggregate intrinsic value of outstanding options and options exercisable as of December 31, 2020 were $170,000 and $130,000, respectively, representing options whose exercise price was less than the closing fair market value of our common stock of $1.65 per share. There were no excess tax benefits realized for tax deductions from stock options exercised during the years ended December 31, 2021 and 2020 as we have recorded a full valuation allowance against our deferred income taxes.

Restricted Stock Units Activity

We account for restricted stock units (RSUs) issued to employees and non-employees at fair value, based on the market price of our stock on the date of grant. RSUs issued in connection with our employee incentive programs typically vest within 10 days of grant. All other RSUs, primarily issued as long term incentives, generally vest annually over three to four years. During the years ended December 31, 2021 and 2020 we recorded $7.8 million and $5.5 million, respectively, of stock-based compensation related to restricted stock units.

A summary of restricted stock unit activity for the year ended December 31, 2021 is as follows:

	Number of Restricted Share Units	Weighted-Average Grant-Date Fair Value Per Share
Outstanding at January 1, 2021	3,038,785	$ 2.53
Granted	2,851,443	4.38
Vested	(2,173,829)	3.51
Forfeited	(289,771)	3.88
Outstanding at December 31, 2021	3,426,628	$ 3.44

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

	Number of Restricted Share Units	Weighted-Average Grant-Date Fair Value Per Share
Outstanding at January 1, 2020	2,556,004	$ 3.38
Granted	3,091,206	2.04
Vested	(2,183,163)	2.82
Forfeited	(425,262)	2.57
Outstanding at December 31, 2020	3,038,785	$ 2.53

As of December 31, 2021, there was $8.6 million of unrecognized compensation expense related to unvested restricted stock unit agreements which is expected to be recognized over a weighted-average period of approximately 2.1 years. For restricted stock unit awards subject to graded vesting, we recognize compensation cost on a straight-line basis over the service period for the entire award. The total fair value of awards vested during the years ended December 31, 2021 and December 31, 2020 was $7.6 million and $6.2 million, respectively.

Market-based Awards

In August 2016, we granted 250,000 market-based restricted stock units to an executive. The restricted stock units are subject to market-based vesting requirements, measured quarterly, based on the average of (a) the average high daily trading price of our common stock for each trading day during the last month of the applicable calendar quarter and (b) the average low daily trading price of our common stock for each trading day during the last month of the applicable calendar quarter, each as reported by The Nasdaq Stock Market, LLC. The restricted stock units are eligible to be earned on a quarterly basis based on a

linear interpolation of the applicable share price, or in the case of a liquidation event, on the day of (or in connection with) such liquidation event based on the applicable transaction price. The share price on the date of issuance was $5.06 per share.

In June 2019, the market-based award was modified to increase the number of restricted stock units to 500,000 and to decrease the applicable share price. Additionally, the performance period was extended to September 30, 2022. The share price on the date of modification was $2.73 per share.

Once earned, the restricted stock units vest 50% on the date such restricted stock units become earned and 50% on September 30, 2022. To determine the fair value of the award, we used a Monte Carlo simulation, which simulates future stock prices for the Company and, hence, shares vested, pursuant to the award. A key input into the model is the expected volatility for our stock. This estimate considered the historical volatility of our stock as well as the stock price volatility of guideline public companies. The fair value was determined to be $74,000 at the original grant date, and was $147,000 as of the modification date. For each of the years ended December 31, 2021 and 2020, we recognized $42,000 of stock compensation expense in connection with this award, which is included in sales, marketing and administration expenses. The unamortized expense related to this award is $31,500 and is expected to be recognized over 0.75 years.

In December 2019, we granted 200,000 market-based restricted stock units to an executive. The restricted stock units are subject to the same market-based vesting requirements discussed for the award granted in August 2016 and modified in June 2019. The share price on the date of issuance was $2.15 per share and the fair value was determined to be $26,000 using a Monte Carlo simulation. For each of the years ended December 31, 2021 and 2020, we recognized $9,000 of stock compensation expense, in connection with this award, which is included in research and development expenses. The unamortized expense related to this award is $6,500 and is expected to be recognized over 0.75 years.

Incentive Bonus Awards

We provide eligible employees, including executives, the opportunity to earn bonus awards upon achievement of predetermined performance goals and objectives. The purpose is to reward attainment of company goals and/or individual performance objectives, with award opportunities expressed as a percentage of base salary. Bonuses can be measured and paid quarterly and/or annually, and are paid in cash, equity or a combination of cash and equity, in the discretion of our compensation committee. If paid in the form of equity, the expense is included in the above disclosures for stock options or restricted stock units as applicable. As of December 31, 2021 and December 31, 2020, there were no accrued incentives that were settled in the form of equity.

Total stock-based compensation recorded in the consolidated statements of comprehensive loss is allocated as follows (in thousands):

	Year Ended December 31, 2021	Year Ended December 31, 2020
Research and development	$ 3,779	$ 2,753
Sales, marketing and administration	4,175	3,071
Total stock-based compensation	$ 7,954	$ 5,824

NOTE 9—LEASES

We lease facilities under two non-cancelable operating leases. The leases expire between January 2022 and November 2024 and include renewal provisions for two to five years, provisions which require us to pay taxes, insurance, maintenance costs or provisions for minimum rent increases. We lease lab equipment under a finance lease. Additionally, we lease facilities and equipment under short-term agreements for a period of 12 months or less and recognize the payments straight-line over the lease term. All of the information presented below, with the exception of total lease costs, relates to our two non-cancelable operating leases and a finance lease with periods of 12 months or greater.

On May 1, 2020 we entered into an amendment for one of our non-cancelable facilities operating leases, under which certain rent payments were deferred and the term of the lease was extended by three months to November 30, 2024. The base rent was deferred for three months and the deferred amount will be repaid over the remaining balance of the modified lease term. In addition, operating expenses were deferred for three months and the deferred amount was paid upon true-up of operating expenses, which occurred in April 2021. We evaluated the amendment under the provisions of ASU No. 2016-02, *Leases (Topic 842)*, as well as subsequently issued interpretive guidance, and elected to account for the concessions as if no

changes to the lease contract were made. In our evaluation we considered the total amount of lease payments both before and after the amendment and determined they are substantially the same.

One facility operating lease requires us to maintain a cash security deposit of $50,000 and also a $55,000 letter of credit in favor of the lessor. The letter of credit was originally for $200,000 at lease inception and steps down $50,000 at each anniversary date if there have been no monetary defaults. The letter of credit is secured by a pledge in favor of the issuing bank of a $55,000 mutual fund account which is classified as restricted cash in our balance sheet.

Lease renewal options are at our discretion. No renewal options have been recognized in our right-of-use assets and lease liabilities as of December 31, 2021. Our lease agreements do not require material variable minimum lease payments, residual value guarantees or restrictive covenants.

Effective as of October 6, 2021, we entered into a Sublease Agreement with Sonim Technologies, Inc. for approximately8,416 square feet of office space in San Mateo, California to serve as a replacement to our current satellite office for employees residing in the San Francisco Bay area. The rent under the sublease is $12,500 per month, and the term will commence on January 17, 2022 and expire on January 31, 2023. We have an option to renew the sublease for an additional one-year term for rent of $13,250 per month. Alan Howe, a member of our board of directors, is a director of Sonim Technologies, and Robert Tirva, a member of our board of directors, is an executive officer of Sonim Technologies.

In December 2020, we entered into a lease for lab equipment. The lease is for60 months and bears an interest rate of5.99%. After evaluation of the lease under ASU No. 2016-02, *Leases (Topic 842)*, we determined the lease to be a finance lease. We recorded a right-of-use asset and lease liability of $204,000 upon inception of the lease.

The Company's weighted average remaining lease term and weighted average discount rate as of December 31, 2021 is shown below:

Weighted average remaining lease term (years)	
Operating leases	2.88
Finance lease	3.92
Weighted average discount rate (%)	
Operating leases	4.75 %
Finance lease	5.99 %

Minimum future maturities of lease liabilities recognized on the consolidated balance sheets as of December 31, 2021 (in thousands):

	Operating Leases	Finance Lease
2022	$ 586	$ 50
2023	584	50
2024	544	50
2025	—	46
Total minimum lease payments	$ 1,714	$ 196
Less: interest	(111)	(21)
Present value of minimum lease payments	$ 1,603	$ 175

Operating lease and non-lease costs were $1,219,000 for the year ended December 31, 2021, of which $804,000 and $415,000 are included in research and development expenses and sales, marketing and administration expenses, respectively. Operating lease and non-lease costs were $1,132,000 for the year ended December 31, 2020, of which $812,000 and $320,000 are included in research and development expenses and sales, marketing and administration expenses, respectively. Operating lease costs include short-term rents and other operating expenses.

Cash paid for amounts included in the measurement of operating lease liabilities were $777,000 and $613,000 for the years ended December 31, 2021and 2020, respectively, which is included in operating activities in the consolidated statement of cash flows.

Finance lease amortization for the years ended December 31, 2021and 2020 was $41,000 and $3,000, respectively, and is included in research and development expenses.

NOTE 10—INCOME TAXES

The provision for income taxes by jurisdiction consists of the following as of December 31, 2021and 2020 (in thousands):

	2021	2020
U.S. federal:		
Current	$ —	$ —
Deferred	—	—
Total U.S. federal	—	—
U.S. state and local:		
Current	1	1
Deferred	—	—
Total U.S. state and local	1	1
Foreign:		
Current	—	—
Deferred	—	—
Total foreign	—	—
Provision for income taxes	$ 1	$ 1

Income taxes differ from the amounts computed by applying the U.S. federal income tax rate to pretax income (loss) before income taxes as a result of the following (in thousands):

	2021	2020
Expected income tax benefit	$ (7,554)	$ (5,966)
State income tax (benefit), net of federal benefit	(2,812)	(1,961)
Valuation allowance	10,761	7,732
Permanent differences:		
Stock options	255	353
Research & development credit	(617)	(560)
Adjustment to deferred taxes	(55)	400
Foreign rate differential	1	(1)
Other	22	4
Provision for income taxes	$ 1	$ 1

For each of the years ended December 31, 2021 and 2020 we recorded a net income tax provision of $1,000. Deferred income tax reflects the tax effects of temporary differences that gave rise to significant portions of our deferred tax assets and liabilities.

Deferred income tax consists of the following (in thousands):

	Balance, December 31, 2021	Balance, December 31, 2020
U.S. federal and state deferred tax assets—long term:		
Accrued payroll	$ 200	$ 180
Accrued expenses	54	53
Fixed assets	36	17
Charitable contributions	28	14
Intangibles	473	431
Research & development credit	4,874	3,830
Net operating loss	44,772	35,279
Stock compensation	658	519
Lease liabilities	499	700
New jobs credit	8	8
Total long-term assets	51,602	41,031
Total deferred tax assets	51,602	41,031
U.S. federal and state deferred tax liabilities—long term:		
Right of use assets	(432)	(621)
Total deferred tax liabilities	(432)	(621)
Net deferred tax assets - long term	51,170	40,410
Less: Valuation allowance	(51,170)	(40,410)
Net deferred tax assets	$ —	$ —
Foreign deferred tax assets—long term:		
Net operating loss	$ 8	$ 6
Total foreign deferred tax assets	8	6
Less: Valuation allowance	(8)	(6)
Net deferred tax assets	$ —	$ —

We recorded a full valuation allowance against our U.S. federal and state net deferred tax assets at December 31, 2021 and December 31, 2020. In determining the need for a valuation allowance, we reviewed all available evidence pursuant to the requirements of FASB ASC Topic 740, *Income Taxes*. Based upon our assessment of all available evidence, we have concluded that it is more likely than not that the net deferred tax assets will not be realized. For the year ended December 31, 2021, the valuation allowance increased by $10.8 million. For the year ended December 31, 2020, the valuation allowance increased by $7.7 million.

As of December 31, 2021, we had federal net operating loss carryforwards of approximately $159.4 million, state net operating loss carryforwards of approximately $162.1 million and foreign net operating loss carryforwards of $52,000 in Switzerland. In accordance with the 2017 Tax Act, the $112.5 million federal net operating loss carryforwards generated on or after January 1, 2018 will not expire and will be limited to 80% usage. The federal net operating loss carryforwards generated prior to January 1, 2018 will begin to expire in 2033, and the state net operating loss carryforwards will begin to expire in 2033. Our ability to utilize federal net operating loss carryforwards may be limited in the event that a change in ownership, as defined in Section 382 of the Internal Revenue Code, occurs in the future. States may vary in its conformity to Section 382 of the Internal Revenue Code. In the event a change of ownership occurs, it will limit the annual usage of the carryforwards in future years. In 2014 and 2017 ownership changes, as defined in Section 382 of the Internal Revenue Code, occurred which resulted in annual limitations on our federal net operating loss carryforwards; however, we believe it is more likely than not that none of the federal net operating loss carryforwards will expire as a result of the limitations under Section 382.

We recognize interest and penalties related to income tax matters in income taxes, and there were none during the years ended December 31, 2021 and 2020. As of December 31, 2021 and 2020, no liability for unrecognized tax benefits was required to be reported.

ASC 740 guidance requires us to identify, evaluate and measure all uncertain tax positions taken or to be taken on tax returns and to record liabilities for the amount of these positions that may not be sustained, or may only partially be sustained, upon examination by the relevant taxing authorities. Although we believe that our estimates and judgments are reasonable, actual results may differ from these estimates. Some or all of these judgments are subject to review by the taxing authorities. For the year ended December 31, 2021, we had uncertain tax positions of $1.2 million as a result of research and development tax credits claimed on our annual tax returns. We had uncertain tax positions of $1.0 million for the year ended December 31, 2020.

Our annual income taxes and the determination of the resulting deferred tax assets and liabilities involve a significant amount of judgment. Our judgments, assumptions and estimates relative to current income taxes take into account current tax laws, their interpretation of current tax laws and possible outcomes of future audits conducted by domestic tax authorities. We operate within federal and state taxing jurisdictions and are subject to audit in these jurisdictions. These audits can involve complex issues which may require an extended period of time to resolve. We are currently not being examined by any tax authorities. We are subject to taxation in the United States, California, Massachusetts and Switzerland. As of December 31, 2021, our tax years remain open to examination by the taxing authorities for all years since our incorporation in 2013.

NOTE 11—COMMITMENTS AND CONTINGENCIES

Purchase Commitments—We have non-cancelable purchasing commitments that we incur in the ordinary course of business. The purchase commitments covered by these agreements are for less than one year and aggregate to $0.7 million as of December 31, 2021.

Legal Proceedings—We may, from time to time, be party to litigation and subject to claims incident to the ordinary course of business. As our growth continues, we may become party to an increasing number of litigation matters and claims. The outcome of litigation and claims cannot be predicted with certainty, and the resolution of any future matters could materially affect our future financial position, results of operations or cash flows.

Legal fees and other costs associated with such actions are expensed as incurred. We assess, in conjunction with our legal counsel, the need to record a liability for litigation and contingencies. Litigation accruals are recorded when and if it is determined that a loss related matter is both probable and reasonably estimable. Material loss contingencies that are reasonably possible of occurrence, if any, are subject to disclosure. We evaluate developments in legal proceedings and other matters on a quarterly basis. As of December 31, 2021 and 2020, there was no litigation or contingency with at least a reasonable possibility of a material loss. No losses have been recorded during the years ended December 31, 2021 and 2020, respectively, with respect to litigation or loss contingencies.

Intellectual Property Indemnities—We indemnify certain customers and manufacturers against liability arising from third-party claims of intellectual property rights infringement related to our products. These indemnities may appear in license agreements, development agreements and manufacturing agreements, may not be limited in amount or duration and generally survive the expiration date of the contract. Given that the amount of any potential liabilities related to such indemnities cannot be determined until an infringement claim has been made, we are unable to determine the maximum amount of losses that we could incur related to such indemnifications.

Director and Officer Indemnities and Contractual Guarantees—We have entered into indemnification agreements with our directors and executive officers, which require us to indemnify such individuals to the fullest extent permitted by Delaware law. Our indemnification obligations under such agreements are not limited in amount or duration. Certain costs incurred in connection with such indemnifications may be recovered under certain circumstances under various insurance policies. Given that the amount of any potential liabilities related to such indemnities cannot be determined until a lawsuit has been filed, we are unable to determine the maximum amount of losses that we could incur relating to such indemnities.

We have also entered into severance and change in control agreements with certain of our executives. These agreements provide for the payment of specific compensation benefits to such executives upon the termination of their employment with us.

Guarantees and Indemnities—In the normal course of business, we are occasionally required to undertake indemnification for which we may be required to make future payments under specific circumstances. We review our exposure under such obligations no less than annually, or more frequently as required. The amount of any potential liabilities related to such obligations cannot be accurately determined until a formal claim is filed. Historically, any such amounts that become payable have not had a material negative effect on our business, financial condition or results of operations. We maintain general and product liability insurance which may provide a source of recovery to us in the event of an indemnification claim.

NOTE 12—RELATED PARTY TRANSACTIONS

In August 2019, we entered into a consulting agreement with a member of our board of directors. Under the agreement, the board member would provide technical advisory services for cash payments totaling $50,000 paid in twelve equal monthly installments as well as an award of restricted stock units equal in value to $100,000 as of the grant date. In the event the board member continues to perform services in subsequent years, the Company will issue new grants equal to no less than $100,000 worth of restricted stock units in January of each additional year with such grants vesting at the end of each year so long as the services are still being provided. The agreement is cancellable at any time by either the Company or the board member. Services have continued to be provided since inception of the agreement. During the year ended December 31, 2021, we recorded expenses of $50,000 in connection with the cash compensation portion of the consulting agreement, which is included in research and development expenses. During the year ended December 31, 2020, we recorded expenses of $50,000 in connection with the cash compensation portion of the consulting agreement, which is included in research and development expenses. Additionally, during the year ended December 31, 2021, we recorded $100,000 related to the restricted stock unit awards, which is included in general and administrative expenses. During the year ended December 31, 2020, we recorded $102,000 related to restricted stock awards, which is included in general and administrative expense. As of December 31, 2021, there was $4,000 due to the board member under his consulting agreement.

In October 2021, we entered into a Sublease Agreement with Sonim Technologies, Inc. for approximately8,416 square feet of office space in San Mateo, California to serve as a replacement to our current satellite office for employees residing in the San Francisco Bay area. The rent under the sublease is $12,500 per month. The term commences on January 17, 2022 and expires on January 31, 2023 with an option to renew the sublease for an additional one-year term for rent of $13,250 per month. Alan Howe, a member of our board of directors, is a director of Sonim Technologies, and Robert Tirva, a member of our board of directors, is an executive officer of Sonim Technologies.

NOTE 13—EMPLOYEE BENEFIT PLAN

We have a 401(k) Savings Retirement Plan that covers substantially all domestic employees who meet the plan's eligibility requirements and provides for an employee elective contribution and employer matching contributions.

We recorded matching contributions to the retirement plan of $524,000 and $494,000 for the years ended December 31, 2021 and 2020, respectively.

NOTE 14—SEGMENTS AND GEOGRAPHIC INFORMATION

We operate in a single segment to design radio frequency filters. In making operating decisions, the Chief Operating Decision Maker, our Chief Executive Officer, primarily considers consolidated financial performance and allocates resources accordingly.

The table below presents our revenue by geographic area (in thousands) and is categorized based on the location of the customer.

	2021	2020
Japan	$ 1,598	$ 2,716
China	289	406
Other	291	38
Total revenue	$ 2,178	$ 3,160

NOTE 15—SUBSEQUENT EVENTS

Merger Agreement

On February 14, 2022, we entered into an Agreement and Plan of Merger (the "Merger Agreement") by and among us and Murata Electronics North America, Inc. ("Murata"), and PJ Cosmos Acquisition Company, Inc. a wholly owned subsidiary of Murata ("Purchaser"). Murata is a wholly-owned subsidiary of Murata Manufacturing Co., Ltd.

Pursuant to the terms and subject to the conditions set forth in the Merger Agreement, on February 28, 2022 Purchaser commenced a cash tender offer (the "Offer") to purchase all of the outstanding shares of the Company's common stock, par value $0.001 per share (the "Shares"), at a purchase price of $4.50 per Share, net to the tendering stockholder in cash, without interest and less any required withholding taxes (the "Per Share Amount"). Upon successful completion of the Offer, and subject to the terms and conditions of the Merger Agreement, Purchaser will be merged with and into us (the "Merger"), and we will survive the Merger as a wholly-owned subsidiary of Murata. At the effective time of the Merger (the "Effective Time"), each outstanding Share (other than Shares held by (i) Resonant, Murata or their respective subsidiaries immediately prior to the

Effective Time and (ii) stockholders of Resonant who have properly and validly perfected their statutory appraisal rights under the Delaware General Corporation Law ("DGCL")) will automatically be converted into the right to receive the Per Share Amount on the terms and subject to the conditions set forth in the Merger Agreement.

The initial expiration date of the Offer is the time that is one minute following 11:59p.p., New York City time, on March 25, 2022, subject to extension in certain circumstances as required or permitted by the Merger Agreement and applicable law. The Offer is subject to the satisfaction of customary conditions, including, among others, that (i) at least that number of Shares validly tendered and not withdrawn (other than Shares tendered by guaranteed delivery where actual delivery has not occurred), when added to any Shares already owned by Murata or any of its controlled subsidiaries, if any, equal a majority of the outstanding Shares as of immediately prior to the time at which Purchaser first accepts for payment the Shares tendered in the Offer, (ii) the expiration or termination of the applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and (iii) the other conditions set forth in Annex A to the Merger Agreement have been satisfied or waived.

The Merger Agreement contemplates that the Merger will be effected pursuant to Section 251(h) of the DGCL, which permits completion of the Merger upon the collective ownership by Murata, Purchaser and any other subsidiary of Murata of one share more than 50% of the number of Shares that are then issued and outstanding, and if the Merger is so effected pursuant to Section 251(h) of the DGCL, no stockholder vote will be required to consummate the Merger.

The Merger Agreement places limitations on our ability to engage in certain types of transactions without Murata's consent during the period between the signing of the Merger Agreement and the Effective Time. During this period, we may not raise additional capital through the sale of securities or incur debt. Further, other than in transactions in the ordinary course of business or within specified dollar limits and certain other limited exceptions, we generally may not acquire other businesses, make investments in other persons, or sell, lease, or encumber our assets.

The Merger Agreement contains certain termination rights for Resonant and Murata. Among such rights, and subject to certain limitations, either Resonant or Murata may terminate the Merger Agreement if the Offer is not completed by June 14, 2022, which date may be extended to August 14, 2022 under certain circumstances.

The Merger Agreement contains certain termination rights for each of us and Murata. Among such rights, and subject to certain limitations, either Resonant or Murata may terminate the Merger Agreement if the Offer is not completed by June 14, 2022, which date may be extended to August 14, 2022 under certain circumstances. The Merger Agreement also provides that upon termination of the Merger Agreement under specified circumstances, we may be required to pay Murata a termination fee of $11.2 million or Murata may be required to pay us a termination fee of $15.0 million. In addition, upon termination of the Merger Agreement under specified circumstances, we may be required to reimburse Murata for up to $3.0 million of expenses. Any expenses we reimburses Murata would be offset against and reduce the amount of the termination fee otherwise payable by us to Murata.

Legal Proceedings

Following announcement of the Merger Agreement and commencement of the Offer, the following lawsuits have been filed against the Company and members of the Company's Board of Directors and certain members of senior management:

United States District Court Stockholder Litigation

On March 1, 2022, Danny Key, a purported stockholder of the Company, filed a complaint against the Company and each member of the Company's Board of Directors in the United States District Court for the Southern District of New York, captioned Danny Key vs. Resonant, Inc., et al., Case No. 1:22-cv-01708 (the "Key Complaint"). The Key Complaint alleges that the defendants violated Sections 14(e), 14(d), and 20(a) of the Exchange Act by omitting and/or misrepresenting material information in the Solicitation/Recommendation Statement on Schedule 14D-9 of Resonant Inc. filed with the SEC on February 28, 2022 (the "Schedule 14D-9") (concerning, among other things, the sale process, the Company's financial projections, and financial valuation analyses provided by the Company's financial advisors) in connection with the proposed transaction contemplated by the Offer. The Key Complaint seeks, among other things, an order enjoining consummation of the transaction; rescission or rescissory damages in the event the transaction is consummated; an order directing the Board of Directors to disseminate a revised Schedule 14D-9; and an award of plaintiff's costs, including reasonable allowance for attorneys' fees and experts' fees.

Between March 4, 2022 and March 11, 2022, five additional complaints were filed in federal district court in New York and one additional complaint was filed in federal district court in Pennsylvania, in each case by purported stockholders of the Company: (i) Miles Weiss vs. Resonant, Inc., et al., Case No. 1:22-cv-01202-FB-PK (E.D.N.Y.) (the "Weiss Complaint"), (ii) Brian Jones vs. Resonant, Inc., et al., Case No. 1:22-cv-01855 (S.D.N.Y.) (the "Jones Complaint"), (iii) Ken Callen vs.

Resonant, Inc., et al., Case No. 1:22-cv-01903 (S.D.N.Y.) (the "Callen Complaint"), (iv) Thomas Valenti vs. Resonant, Inc., et al., Case No. 1:22-cv-01244 (E.D.N.Y.) (the "Valenti Complaint"), (v) Benny Ruff vs. Resonant, Inc., et al., Case No. 2:22-cv-00861(E.D. Pa.) (the "Ruff Complaint"), and (vi) Jeffrey D. Justice, II vs. Resonant Inc. et al., Case No. 1:22-cv-01353 (E.D.N.Y.) (the "Justice Complaint"). The Weiss Complaint was voluntarily dismissed by the plaintiff on March 11, 2022.

Each of the Jones Complaint, the Valenti Complaint, the Ruff Complaint and the Justice Complaint asserts claims under Sections 14(e), 14(d), and 20(a) of the Exchange Act, and Rule 14d-9 promulgated thereunder, alleging, among other things, that defendants omitted certain material facts related to the transaction from the Schedule 14D-9. The Callen Complaint, which asserts claims under Sections 14(e) and 20(a) of the Exchange Act, alleges, in addition, that the disclosure regarding the Company's financial projections is false and misleading in view of alleged prior statements by the Company on certain earnings calls. Each of the Jones Complaint, the Valenti Complaint, the Callen Complaint, the Ruff Complaint and the Justice Complaint seeks, among other things, to enjoin the defendants from consummating the transaction, rescissory damages should the transaction not be enjoined, and an award of attorneys' fees and experts' fees.

The Company and the Board believe that the allegations in each of the foregoing complaints are without merit and intend to defend their position. However, a negative outcome in any lawsuit could have a material adverse effect on the Company if it results in preliminary or permanent injunctive relief or rescission of the Merger Agreement. In addition, although the Company has directors and officers liability insurance, the Company anticipates that it will incur significant expense within its self-insured retention under that insurance. The Company is not currently able to predict the outcome of any of the lawsuits with any certainty. Additional lawsuits may be filed against the Company, the Board of Directors or management in connection with the Merger Agreement and the Schedule 14D-9.

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

The phrase "disclosure controls and procedures" refers to controls and procedures designed to ensure that information required to be disclosed in our reports filed or submitted under the Securities Exchange Act of 1934, as amended, or the Exchange Act, such as this Annual Report on Form 10-K, is recorded, processed, summarized and reported within the time periods specified in the rules and forms of the U.S. Securities and Exchange Commission, or SEC. Disclosure controls and procedures are also designed to ensure that such information is accumulated and communicated to our management, including our chief executive officer, or CEO, and chief financial officer, or CFO, as appropriate to allow timely decision regarding required disclosure.

Our management, with the participation of our CEO and CFO, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act), as of December 31, 2021, the end of the period covered by this Annual Report on Form 10-K. Based on such evaluation, our CEO and CFO have concluded that as of December 31, 2021, our disclosure controls and procedures were designed at a reasonable assurance level and were effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in the rules and forms of the SEC, and that such information is accumulated and communicated to our management, including our CEO and CFO, as appropriate, to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles.

Our management, with the participation of our CEO and CFO, has assessed the effectiveness of the internal control over financial reporting as of December 31, 2021. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control - Integrated Framework (2013 Framework)*. Based on this evaluation, our management has concluded that our internal control over financial reporting was effective as of December 31, 2021.

This Annual Report on Form 10-K does not include an attestation report of our registered public accounting firm on our internal control over financial reporting due to an exemption established for smaller reporting companies.

Changes in Internal Controls over Financial Reporting

There was no change in our internal control over financial reporting identified in management's evaluation pursuant to Rules 13a-15(d) or 15d-15(d) of the Exchange Act during the quarter ended December 31, 2021 that materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Limitations on Effectiveness of Controls and Procedures

In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Directors

The table below provides information regarding our directors as of March 14, 2022. There are no family relationships among any of our directors.

Name	Age	Director Since
Rubén Caballero	54	2019
Michael J. Fox	44	2016
George B. Holmes	59	2016
Alan B. Howe	60	2018
Jack H. Jacobs	76	2018
Joshua Jacobs	51	2018
Jean F. Rankin	63	2017
Robert Tirva	55	2018

Director Biographies

Rubén Caballero. Mr. Caballero has served as a member of our board of directors and as a technical advisor since August 2019. In April 2020, Mr. Caballero joined Microsoft Corporation, as Corporate Vice President of Engineering for Hardware Design and Technology, where his role is to oversee Mixed Reality and AI, enhancing the capabilities of Microsoft's hardware products, including HoloLens and other special projects. In 2019, Mr. Caballero became a Technical Advisor to multiple startup companies in Silicon Valley including Humane Inc., Keyssa Inc. and Maui Imaging Inc. Since November 2019, Mr. Caballero has served as a member of the board of directors of Movano Inc. (Nasdaq; MOVE), a health-focused technology company developing a proprietary platform that uses radio frequency technology to enable the creation of low-cost and scalable sensors that are small enough to fit into a wearable and other small form factors. From 2005 to early 2019, Mr. Caballero served as Vice President of Engineering at Apple Inc., where he was one of the founding leaders of the iPhone hardware team and later expanded his role to include iPad, Apple Watch, Macintosh and all other hardware products. He also became the product leader for the last generations of Apple TV and Airport devices leading multiple engineering organizations. He also founded, built and scaled a world class Wireless Design and Technology team of over 1,000 engineers for all the products/ecosystems at Apple (iPhone, iPad, Macs, AirPods, HomePod and accessories). Prior to Apple, Mr. Caballero worked in two startups in Silicon Valley. From 2004 to 2005, he was Director of System Engineering at Radial Labs Inc., a consumer electronics company where he worked on the design of innovative products and core technology for wireless networked audio components and devices. From 2001 to 2004, he was Director of System Engineering & Products at Tropian Inc., where he oversaw the team performing R&D, prototyping, integration and testing of Wireless Systems and handsets including all wireless technologies. Mr. Caballero started his career in the Canadian Air Force (Captain), where his officer's career culminated in being responsible for the design engineering of the Flight Instrumentation & Telecommunication System of experimental F18 aircrafts. Nominated by CNET en Español "One of the 20 most influential Latinos in tech, 2018", Mr. Caballero also received an Honorary Doctorate from the University of Montréal & École Polytechnique in 2019. He also holds a Master's Degree in Electrical Engineering from New Mexico State University and a Bachelor's Degree in Electrical Engineering from the École Polytechnique de Montréal. Mr. Caballero was selected to serve on our board of directors because of his extensive experience working with wireless technologies and commercializing products for one of the world's largest companies.

Michael J. Fox. Mr. Fox has served as a member of our board of directors since February 2016, and as our Lead Independent Director since June 2019. He is the Chief Executive Officer of Park City Capital, LLC, a value-oriented investment management firm he founded in June 2008 and the Co-Founder of Julie's Real Foods LLC, a fast-growing natural food company that he co-founded with his wife, Julie, in December 2015. From 2000 to 2008, Mr. Fox worked at J.P. Morgan in New York, most recently as Vice President and Senior Business Services Analyst. As J.P. Morgan's Senior Business Services Analyst, Mr. Fox headed the firm's Business Services equity research group from 2005 to 2008. From 2000 to 2005 Mr. Fox was a member of J.P. Morgan's Leisure equity research group, which was consistently recognized by Institutional Investor's All America Research Team. Mr. Fox serves on the board of directors of Regional Health Properties, Inc.(NYSE American: RHE), a healthcare real estate investment company. Mr. Fox received his Bachelor of Business Administration degree from Texas Christian University. Mr. Fox's expertise and background in the financial and equity markets, coupled with Park City Capital's significant financial stake in our company, enable him to provide our board of directors and management with valuable perspectives on executing strategies to maximize stockholder value.

George B. Holmes. Mr. Holmes joined Resonant in February 2016 as President and Chief Commercial Officer and as a member of our board of directors, and was appointed Chief Executive Officer in January 2017 and Chairman of the Board in June 2019. Mr. Holmes brings to us more than 30 years' leadership experience in sales, marketing and management spanning a broad range of technologies, including semiconductor, optical components and systems and sub-systems for telecom and CATV. Prior to joining Resonant, Mr. Holmes most recently served as Chief Commercial Officer for Tigo Energy, where he was responsible for creating the company's customer acquisition and expansion strategy. From 2013 to 2015, he worked for Energous Corporation, a developer of wire-free charging technology for electronic devices, first as Senior Vice President Sales & Marketing then as Chief Commercial Officer where he was responsible for securing development and licensing agreements, overseeing IP strategy and process, spearheading regulatory strategy and tactics and public and investor relations. From 2011 to 2013, he served as Vice President of Sales at SolarBridge Technologies, overseeing all sales, business development and sales operations. His prior experience includes serving as Senior Vice President of Sales and Marketing for PureEnergy Solutions, a developer and manufacturer of wireless power products as well as senior sales executive roles at Agere Systems (formerly Lucent MicroElectronics), Ortel Corp (acquired by Lucent), Level One Communications and Symmetricom. Mr. Holmes holds a B.A. in Business from the University of Puget Sound and a Diploma in international business from Nyenrode University, Netherlands. Mr. Holmes was selected to serve on our board of directors because of his extensive experience commercializing technologies.

Alan B. Howe. Mr. Howe has served on our board of directors since June of 2018. Mr. Howe has served as co-founder and Managing Partner of Broadband Initiatives, LLC, a boutique corporate advisory and strategic consulting firm, since 2001. Previously, he held various executive management positions at Covad Communications, Inc., Teletrac, Inc., Sprint and Manufacturers Hanover Trust Company. Mr. Howe is an experienced public company director. He currently is a member of the board of directors of Sonim Technologies Inc.(Nasdaq: SONM), Babcock & Wilcox (NYSE: BW), Orion Energy Systems, Inc. (Nasdaq: OESX), and NextNav (Nasdaq: NN). During the past five years, he also previously served as a director of Data I/O, Spartacus Acquisition Corp., MagicJack Vocaltec, Ltd., CafePress, Inc., Widepoint Corporation, Urban Communications, Inc. and Determine, Inc. Mr. Howe received a Masters of Business Administration from the Kelley Business School at Indiana University and a Bachelors of Science - Business Administration and Marketing from the Gies School of Business at the University of Illinois. Mr. Howe was selected to serve on our board of directors because of operational, corporate finance, business development and leadership experience as well as his in depth strategic knowledge of the wireless, telecommunications, high technology and software industries.

Jack H. Jacobs. Mr. Jacobs has served as a member of our board of directors since June 2018. Mr. Jacobs has been an on-air commentator for MSNBC since 2002 and is a principal of The Fitzroy Group, Ltd., a firm that specializes in the development of residential real estate. He held the McDermott Chair of Politics at West Point from 2005 to 2020, and since 2020 has been the Senior Fellow. Mr. Jacobs was a co-founder and Chief Operating Officer of AutoFinance Group Inc., one of the firms to pioneer the securitization of debt instruments, from 1988 to 1989. The firm was acquired by KeyBank. Previously he was a Managing Director of Bankers Trust Corporation, a diversified financial institution and investment bank. Mr. Jacobs' military career included two tours of duty in Vietnam, where he was among the most highly decorated soldiers, earning three Bronze Stars, two Silver Stars and the Medal of Honor, the nation's highest combat decoration. He retired from active military duty as a Colonel in 1987. Mr. Jacobs has been a member of the board of directors of Paragon Technologies, Inc. since 2012 and a director of Datatrak International, Inc., a technology and services company delivering solutions for the clinical trials industry, since 2016. Mr. Jacobs received a B.A. and a Master's degree from Rutgers University. Mr. Jacobs was selected to serve on our board of directors because of his public company, corporate governance and leadership experience.

Joshua Jacobs. Mr. Jacobs has served as a member of our board of directors since June 2018. Mr. Jacobs most recently served as the President and Board Director of Maven, Inc., a business operations platform for professional internet publishers, where he led its board of directors and oversaw business operations. Mr. Jacobs also serves on the board of Logiq, Inc. From 2015 to 2016, Mr. Jacobs served as President of Services at Kik Interactive, where he led the creation of a developer and advertising ecosystem powered by one of the world's leading chat and messaging platforms. From 2011 to 2015, he served as the Chief Executive Officer of Accuen Inc., the programmatic media buying platform of Omnicom Media Group, and as President of Omnicom Media Group. From 2009 to 2011, Mr. Jacobs served as the Senior Vice President of Advertising Products and Global Marketing at Mode Media, where he oversaw all aspects of brand advertising, applications and ad partners as well as global marketing, including brand and agency marketing, corporate communications and research. His prior experience includes serving as Vice President and General Manager of Marketing Technology for Yahoo!, President of X1 Technologies, Inc., and a senior executive of Bigstep, Inc. Mr. Jacobs was selected to serve on our board of directors because of his extensive experience commercializing technologies.

Jean F. Rankin. Ms. Rankin has served as a member of our board of directors since July 2017. Ms. Rankin served as Executive Vice President, Secretary and General Counsel for LSI Corporation, a designer of semiconductors and software that accelerated storage and networking in data centers, mobile networks and client computing, from 2007 to May 2014, when LSI was acquired by Broadcom Limited (formerly Avago Technologies). Ms. Rankin was a key participant in the strategic process

and negotiations resulting in the company's successful sale to Broadcom. At LSI, Ms. Rankin managed the company's intellectual property licensing business. Ms. Rankin currently serves on the Board of Directors of InterDigital, Inc., a public company that designs and develops advanced technologies to enable and enhance wireless communications. InterDigital has an extensive patent portfolio and derives a majority of its revenue from licensing its patents. Ms. Rankin chairs the Compensation Committee and is also a member of the Nominating and Governance Committee. Prior to that, Ms. Rankin served as General Counsel for Agere Systems Inc., before it merged with LSI in April 2007. Prior to Agere, Ms. Rankin held several positions of increasing responsibility at Lucent Technologies, Inc. over a five-year span, as well as at AT&T for six years. She holds a law degree from University of Pennsylvania Law School and a B.A. from the University of Virginia. Ms. Rankin was selected to serve on our board of directors because of her extensive experience as an executive of technology companies and licensing expertise.

Robert Tirva. Mr. Tirva has served as a member of our board of directors since October 2018. Mr. Tirva serves as the President, Chief Operating Officer and Chief Financial Officer of Sonim Technologies, a leading U.S. provider of ultra-rugged mobility solutions. Prior to Sonim, he was the chief financial officer of Intermedia, a leading cloud UCaaS and business application provider from 2016 to 2019, where he was responsible for all of Intermedia's global financial functions. Prior to Intermedia, he was corporate controller at Dropbox from 2014 to 2016, where he was responsible for developing the company's accounting organization. Before Dropbox, he spent nearly 14 years at Broadcom Corporation, where he held a range of finance roles of increasing responsibility, including senior vice president, principal accounting officer and vice president of finance. He also has career experience with IBM Corporation, Navistar Financial Corporation and Ernst & Young. Mr. Tirva holds an MBA from the Yale School of Management and a Bachelor of Business Administration degree in Accounting from the University of Notre Dame. He is a certified public accountant licensed in Illinois, but is not engaged in public practice. Mr. Tirva was selected to serve on our board of directors because of his extensive experience as an executive of technology companies and his financial and accounting expertise.

Executive Officers

The following table provides information regarding our executive officers as of March 14, 2022. Our executive officers are appointed by our board of directors and serve until their successors have been duly elected and qualified. There are no family relationships among any of our directors or executive officers.

Executive	Age	Position
George B. Holmes	59	Chief Executive Officer
Martin McDermut	71	Chief Financial Officer and Secretary
Neal Fenzi	61	Chief Technology Officer
Dylan Kelly	44	Chief Operating Officer
Lisa Wolf	59	Chief Accounting Officer
Clinton Brown	62	Senior Vice President of Sales and Marketing

Executive Officer Biographies

Please see "Directors" above for information about Mr. Holmes, who also serves on our Board.

Martin McDermut. Mr. McDermut has served as our Chief Financial Officer since November 2018. Prior to joining Resonant, Mr. McDermut served as Vice President and Chief Financial Officer of Applied Micro Circuits Corporation, a publicly traded semiconductor company, from January 2016 to February 2017 when the company was acquired by MACOM Technology Solutions Holdings, Inc. Prior to that Mr. McDermut served as Senior Vice President, Finance and Chief Financial Officer of Vitesse Semiconductor Corporation, a publicly traded semiconductor company, from August 2011 to April 2015 when the company was acquired by Microsemi Corporation. Prior to that Mr. McDermut served as a managing director and consultant at Avant Advisory Group, LLC, a management consulting firm based in Los Angeles and Santa Barbara, CA. He also served as chief financial officer for other publicly traded companies including IRIS International Inc. and Superconductor Technologies Inc. He was a partner at the public accounting firm of Coopers & Lybrand LLP (now known as PricewaterhouseCoopers LLP). Currently he is a member of the board of directors of CDTi Advanced Materials, Inc., Sansum Clinic and Public Square Santa Barbara. Mr. McDermut holds a BA in economics from the University of Southern California and an MBA from the University of Chicago Booth School of Business. He is a Certified Public Accountant.

Neal Fenzi. Mr. Fenzi is a co-founder of Resonant and was appointed Chief Technology Officer in June 2020 following his appointment as Co-Chief Technology Officer in March 2020. Prior to this appointment, Mr. Fenzi served as our Executive Vice President of Engineering since June 2017, our Chief Operating Officer from December 2014 until June 2017, our Vice President of Engineering from June 2013 to December 2014, and our Secretary and Treasurer from June 2013 until

January 2014. Mr. Fenzi also served as Vice President of Engineering of our predecessor, Resonant LLC, from June 2012 until June 2013. Prior to founding Resonant, from 1991 until June 2012, Mr. Fenzi served in engineering, operations and marketing positions at Superconductor Technologies Inc., including as Vice President of Engineering, Chief Engineer and Vice President of Product Management. Mr. Fenzi holds a BSEE degree from New Mexico State University.

Dylan Kelly. Mr. Kelly joined Resonant in December 2019 as Chief Operating Officer. Mr. Kelly brings to us more than 20 years' leadership experience in semiconductor product development, product marketing and high-volume manufacturing spanning a broad range of applications, including smartphones, wireless infrastructure, test and measurement, and aerospace and defense. Prior to joining Resonant, Mr. Kelly most recently served as President and Chief Operating Officer for pSemi, a Murata Company, where he was responsible for the company's RF semiconductor business, as well as corporate manufacturing operations, IT, and quality. Prior to this role, Mr. Kelly served as Vice President and General Manager of the Mobile Wireless business unit from 2010 to 2017. Before being acquired by Murata in 2014, pSemi was known as Peregrine Semiconductor, a publicly traded company from 2012 to 2014. Mr. Kelly pioneered the use of silicon-on-insulator technology for RF front-end applications with the company from 2000 - 2010 and held numerous positions in development, marketing and sales management positions. Mr. Kelly started his career at Motorola in 1999 in the development of RF transceivers. Mr. Kelly holds a B.S. degree in electrical engineering from the University of Texas at Austin and an M.S. degree in electrical engineering from the University of California, San Diego. He is the author of numerous technical papers and has 37 issued and pending patents.

Lisa Wolf. Ms. Wolf joined Resonant in 2014 as Controller, was promoted to Vice President of Finance in 2016, and now serves as the Chief Accounting Officer. Ms. Wolf is a CPA with over 20 years of public accounting experience including audit of public companies, financial reporting, design and implementation of internal controls and SEC reporting. Additionally, Ms. Wolf has held several positions as Controller at a variety of both public and private companies. Most recently, prior to joining Resonant, Ms. Wolf served as Controller of ArmaGen Inc., a biotechnology company devoted to the development of new drugs to treat human brain disorders. Ms. Wolf holds a BS in Business Administration with an emphasis in Accounting from California State University, Northridge.

Clint Brown. Mr. Brown has served as our Senior Vice President of Sales and Marketing since October 2021. Prior to joining Resonant, Mr. Brown served as Director of Business Development Mobility Wireless Connectivity at Broadcom. He has more than 30 years of experience in sales, business development and marketing experience, specializing in semiconductor-based wireline and wireless communication technologies, including 802.11 WLAN, Bluetooth, FM, GNSS, NFC, Wireless Charging, Ethernet, Home Phoneline Networking (HomePNA), and Analog Modems. Mr. Brown has also served on the Board of the Wi-Fi Alliance.

Corporate Governance

Our business affairs are managed under the direction of our board of directors, which is currently comprised of eight members. Each director's term will continue until the election and qualification of his or her successor, or his or her earlier death, resignation, or removal.

Committees of the Board of Directors

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee, each of which has the composition and responsibilities described below. Members will serve on these committees until their resignation or as otherwise determined by our board of directors. Each of these standing committees operates under a written charter adopted by the board of directors. The charters are available on the "Investors" portion of our website at *www.resonant.com*.

The table below provides current membership information for each of the three standing board committees.

	Committees		
Name	**Audit**	**Compensation**	**Nominating and Corporate Governance**
Rubén Caballero			
Michael J. Fox		X	Chair
George B. Holmes			
Alan B. Howe	X		
Jack H. Jacobs		X	X
Joshua Jacobs		X	X
Jean F. Rankin	X	Chair	
Robert Tirva	Chair		X
Number of Committee Meetings Held in Fiscal 2021	5	13	3

Audit Committee. Messrs. Howe and Tirva and Ms. Rankin, each of whom is a non-employee member of our board of directors, serve on our audit committee, and Mr. Tirva chairs the committee. Our board of directors has determined that each of the members of the audit committee satisfies the requirements for independence and financial literacy under the rules and regulations of The Nasdaq Stock Market LLC (NASDAQ) and the SEC. Our board of directors has also determined that Mr. Tirva qualifies as an "audit committee financial expert," as defined in the SEC rules, and satisfies the financial sophistication requirements of NASDAQ. The audit committee is responsible for, among other things:

- appointing, overseeing, and if need be, terminating any independent auditor;
- assessing the qualification, performance and independence of our independent auditor;
- reviewing the audit plan and pre-approving all audit and non-audit services to be performed by our independent auditor;
- reviewing our financial statements and related disclosures;
- reviewing the adequacy and effectiveness of our accounting and financial reporting processes, systems of internal control and disclosure controls and procedures;
- reviewing our overall risk management framework;
- overseeing procedures for the treatment of complaints on accounting, internal accounting controls, or audit matters;
- reviewing and discussing with management and the independent auditor the results of our annual audit, reviews of our quarterly financial statements and our publicly filed reports;
- reviewing and approving related person transactions; and
- preparing the audit committee report that the SEC requires in our annual proxy statement.

Compensation Committee. Messrs. Fox, Jack Jacobs and Joshua Jacobs and Ms. Rankin, each of whom is a non-employee member of our board of directors, comprise our compensation committee, and Ms. Rankin chairs the committee. Our board of directors has determined that each of the members of the compensation committee meets the requirements for independence under the rules of NASDAQ and the SEC. The compensation committee is responsible for, among other things:

- reviewing the elements and amount of total compensation for all officers;
- formulating and recommending any proposed changes in the compensation of our chief executive officer for approval by the board;
- reviewing and approving any changes in the compensation for officers, other than our chief executive officer;
- administering our equity compensation plans;
- reviewing annually our overall compensation philosophy and objectives, including compensation program objectives, target pay positioning and equity compensation; and
- preparing the compensation committee report that the SEC will require in our annual proxy statement.

Nominating and Corporate Governance Committee. Messrs. Fox, Jack Jacobs, Joshua Jacobs and Tirva, each of whom is a non-employee member of our board of directors, comprise our nominating and corporate governance committee, and Mr. Fox chairs the committee. Our board of directors has determined that each of the members of the nominating and corporate

governance committee meets the requirements for independence under the rules of NASDAQ for service on this committee. The nominating and corporate governance committee is responsible for, among other things:

- evaluating and making recommendations regarding the composition, organization and governance of our board of directors and its committees;
- identifying, recruiting and nominating director candidates to the board if and when necessary;
- evaluating and making recommendations regarding the creation of additional committees or the change in mandate or dissolution of committees;
- reviewing and making recommendations with regard to our corporate governance guidelines and compliance with laws and regulations; and
- reviewing and approving conflicts of interest of our directors and corporate officers, other than related person transactions reviewed by the audit committee.

Other Board Committees. Our board of directors forms ad hoc committees from time-to-time to assist the board in fulfilling its responsibilities with respect to matters that are the subject of the ad hoc committee's mandate.

Corporate Governance Guidelines; Code of Business Conduct and Ethics

Our board of directors has adopted Corporate Governance Guidelines. These guidelines address items such as the qualifications and responsibilities of our directors and director candidates and corporate governance policies and standards applicable to us. In addition, our board of directors has adopted a Code of Business Conduct and Ethics that applies to all of our employees, officers and directors, including our chief executive officer, chief financial officer, and other executive and senior financial officers. The full text of our Corporate Governance Guidelines and our Code of Business Conduct and Ethics is posted on the Investor Relations portion of our website at ir.resonant.com. We will post amendments to our Code of Business Conduct and Ethics or waivers of our Code of Business Conduct and Ethics for directors and executive officers on the same website.

ITEM 11. EXECUTIVE COMPENSATION

Summary Compensation Table

The following table provides information regarding the compensation of our named executive officers during 2021 and 2020. As a "smaller reporting company," as such term is defined in the rules promulgated under the Securities Act of 1933, as amended, or the Securities Act, we are required to provide compensation disclosure for our principal executive officer and the two most highly compensated executive officers other than our principal executive officer. These three officers are referred to as our "named executive officers."

Name and Principal Position	Year	Salary ($)	Stock Awards ($)(1)	Non-Equity Incentive Plan Compensation($)(2)	All Other Compensation($)(3)	Total ($)
George Holmes	2021	423,425	1,020,848	271,557 (4)	68,206	1,784,036
Chief Executive Officer	2020	400,000	348,000	100,000 (5)	34,961	882,961
Martin McDermut	2021	314,251	395,971	181,407 (6)	14,500	906,129
Chief Financial Officer	2020	306,482	102,813	140,731 (7)	14,250	564,276
Dylan Kelly	2021	299,055	388,588	158,093 (8)	14,500	860,236
Chief Operating Officer	2020	285,000	429,000	128,253 (9)	14,250	856,503

(1) These amounts represent the grant date fair value of the stock awards determined in accordance with ASC Topic 718. These amounts may not correspond to the actual value eventually realized by the officer, which depends in part on the market value of our common stock in future periods. Assumptions used in calculating these amounts are set forth in the Notes to Consolidated Financial Statements included in this annual report on Form 10-K.

(2) Non-equity incentive plan compensation represents incentive bonuses earned pursuant to awards granted under an incentive bonus plan which permits the compensation committee of the board, as the administrator of such plan, to settle such awards in cash, stock, options, or a combination thereof.

(3) All Other Compensation in 2021 included the following:

Name	Insurance Premiums ($)	401(k) Matching Contributions ($)	Total ($)
George Holmes	53,706	14,500	68,206
Martin McDermut	—	14,500	14,500
Dylan Kelly	—	14,500	14,500

(4) This amount was settled by delivery of $271,577 in cash.

(5) This amount was settled by delivery of $100,000 in cash.

(6) This amount was settled by deliver of (i) $96,596 in cash, and (ii) 30,302 restricted stock units.

(7) This amount was settled by deliver of (i) $59,625 in cash, and (ii) 32,093 restricted stock units.

(8) This amount was settled by delivery of (i) $91,965 in cash, and (ii) 23,807 restricted stock units.

(9) This amount was settled by delivery of (i) $67,733 in cash, and (ii) 23,882 restricted stock units.

Narrative Disclosure to Summary Compensation Table

The compensation committee of the board is responsible for the executive compensation programs for our executive officers and reports to the board on its discussions, decisions and other actions. Typically, our chief executive officer makes recommendations to our compensation committee, often attends committee meetings and is involved in the determination of compensation for the executive officers that report to him, except that he does not make recommendations as to his own compensation. Our chief executive officer makes recommendations to our compensation committee regarding short-term and long-term compensation for all executive officers, excluding himself, based on our results, an individual executive officer's contribution toward these results and performance toward individual goal achievement. Our compensation committee then reviews the recommendations and other data and makes decisions as to total compensation for each executive officer other than the chief executive officer, as well as each individual compensation component. The compensation committee makes recommendations to the board regarding compensation for the chief executive officer. The independent members of the board make the final decisions regarding executive compensation for our chief executive officer.

Compensation Elements

Our compensation package for executive officers consists of base salary, annual incentive (bonus) awards, and long-term equity-based compensation. The executive officers are also eligible to participate in all of our employee benefit plans. We also provide in certain circumstances, a sign-on bonus to executive officers, which may be applied against and reduce any other bonus to which the executive is entitled for one or more fiscal years and must be repaid if the executive officer voluntarily terminates employment with us other than for good reason within one year of commencement of employment.

Base Salary. We provide competitive base salaries to pay for day-to-day service in light of each individual's duties and responsibilities, experience, expertise and individual performance. Individual salary levels are determined based on assessments of internal job responsibilities, experience in the role, and market levels for comparable positions. Salary increases also are determined based on market levels of compensation and an assessment of individual and team performance for the year.

Annual base salaries as of December 31, 2020 and 2021 and as of March 14, 2022 for the named executive officers are as follows:

Executive	2020 Annual Base Salary	2021 Annual Base Salary	2022 Annual Base Salary
George Holmes	$ 400,000	$ 425,000	$ 425,000
Martin McDermut	$ 307,340	$ 314,716	$ 333,599
Dylan Kelly	$ 285,000	$ 300,000	$ 316,500

Incentive (Bonus) Awards. We provide eligible employees, including our named executive officers, the opportunity to earn bonus awards upon achieving predetermined performance goals and objectives. The purpose is to reward attainment of company goals and/or individual performance objectives, with award opportunities expressed as a percentage of base salary. Bonuses can be measured and paid quarterly and/or annually, and are paid in cash, equity or a combination of cash and equity, in the discretion of our compensation committee.

2021 Incentive Bonus Program. During 2021, our executive officers, including our named executive officers, participated in the 2021 incentive bonus program. The program provided for the award of quarterly and/or annual bonuses to our employees and executive officers (other than our chief executive officer) if certain performance goals, based on company-

wide billings, expenses and certain other individual non-monetary targets, were attained in quarterly and annual performance periods during our 2021 fiscal year. The awards contained a combination of service conditions and performance conditions based on the achievement of specified performance thresholds. The awards were based on each individual's annual salary multiplied by a bonus multiplier percentage which had been determined by our compensation committee. The plan also allowed for additional discretionary awards to non-executive employees up to 10% of the total base salaries of non-executive employees. Our chief executive officer was eligible for the award of an annual bonus if certain performance goals, based on company-wide billings, expenses and stock price performance, were attained during the fiscal 2021 annual performance period. The bonuses for the first three quarters were paid in restricted stock, and the fourth quarter and annual bonuses were paid in cash. The number of shares underlying equity awards granted to each employee in payment of quarterly bonuses was determined based on the performance bonus amount to be paid in equity, divided by our closing stock price on the grant date.

Our named executive officers received the following quarterly and annual incentive bonus awards during 2021:

Executive	First Quarter ($)(1)	Second Quarter ($)(2)	Third Quarter ($)(3)	Fourth Quarter ($)(4)	Fiscal Year ($)(4)	Total 2021 Bonus ($)
George Holmes [5]	—	—	—	—	271,577	271,577
Martin McDermut	30,088	25,643	29,080	24,453	72,143	181,407
Dylan Kelly	21,146	19,782	25,200	23,310	68,655	158,093

(1) Payable 100% in restricted stock units, with the number of restricted stock units determined by dividing the total dollar amount of the bonus to be paid in restricted stock units by the closing sales price of the Corporation's common stock on the date of approval. The restricted stock units vested in full on May 18, 2021.

(2) Payable 100% in restricted stock units, with the number of restricted stock units determined by dividing the total dollar amount of the bonus to be paid in restricted stock units by the closing sales price of the Corporation's common stock on the date of approval. The restricted stock units vested in full on August 17, 2021.

(3) Payable 100% in restricted stock units, with the number of restricted stock units determined by dividing the total dollar amount of the bonus to be paid in restricted stock units by the closing sales price of the Corporation's common stock on the date of approval. The restricted stock units vested in full on November 16, 2021.

(4) Payable 100% in cash.

(5) Mr. Holmes was only eligible to receive an annual bonus for fiscal year 2021. This amount includes $221,577 earned under the 2021 incentive bonus program and a discretionary amount of $50,000.

Long-term Equity Incentives. We deliver long-term incentive value through the award of stock options and restricted stock units to our employees. Awards of equity compensation are made in the discretion of our compensation committee pursuant to the terms of the Resonant Inc. Amended and Restated 2014 Omnibus Incentive Plan. Employees typically receive an initial award upon joining the company, and additional awards on an annual basis.

2021 Long-term Equity Incentive Awards. Our named executive officers received the following long-term equity incentive awards during 2021:

Executive	RSUs (#)
George Holmes (1)	154,440
Martin McDermut (2)	77,333
Dylan Kelly (3)	76,216

(1) The RSUs vest in four equal annual installments on December 1, 2021, 2022, 2023 and 2024.

(2) 47,333 RSUs vest in four equal annual installments on December 1, 2021, 2022, 2023 and 2024. 30,000 RSUs vest in four equal annual installments on May 13, 2021, December 1, 2021, 2022, and 2023.

(3) 46,216 RSUs vest in four equal annual installments on December 1, 2021, 2022, 2023 and 2024. 30,000 RSUs vest in four equal annual installments on May 13, 2021, December 1, 2021, 2022, and 2023.

Outstanding Equity Awards at Fiscal Year End

The following table presents certain information concerning equity awards held by our named executive officers as of December 31, 2021.

		Option Awards				Stock Awards			
Name	Grant Date	Number of Securities Underlying Unexercised Options Exercisable (#)	Number of Securities Underlying Unexercised Options Unexercisable (#)	Option Exercise Price per Share ($)	Option Expiration Date	Number of Shares or Units of Stock That Have Not Vested (#)	Market Value of Shares or Units of Stock That Have Not Vested ($)(1)	Equity Incentive Plan Awards: Number of Unearned Shares, Units or other Rights That Have Not Vested (#)	Equity Incentive Plan Awards: Market or Payout Value of Unearned Shares, Units or Other Rights That Have Not Vested ($)(1)
George Holmes	8/7/2017	5,824 (2)	—	4.51	8/7/2027	—	—	—	—
	11/6/2017	7,663 (3)	—	4.62	11/6/2027	—	—	—	—
	1/24/2019	—	—	—	—	24,013 (4)	41,062	—	—
	6/11/2019	—	—	—	—	3,205 (4)	5,481	—	
	6/11/2019	—	—	—	—	—	—	500,000 (5)	855,000
	2/12/2020	—	—	—	—	100,000 (6)	171,000	—	—
	1/21/2021	—	—	—	—	115,830 (7)	198,069	—	—
Martin McDermut	5/28/2014	12,000(8)	—	6.00	45,440	—	—	—	—
	1/24/2019	—	—	—	—	1,918 (4)	3,280	—	—
	2/12/2020	—	—	—	—	29,544 (6)	50,520	—	—
	1/21/2021	—	—	—	—	35,499 (7)	60,703	—	—
	5/9/2021	—	—	—	—	15,000 (9)	25,650	—	—
Dylan Kelly	12/2/2019	—	—	—	—	100,000 (6)	171,000	—	—
	12/2/2019	—	—	—	—	—	—	200,000 (5)	342,000
	3/9/2020	—	—	—	—	25,000 (6)	42,750	—	—
	11/12/2020	—	—	—	—	75,000 (6)	128,250	—	—
	1/21/2021	—	—	—	—	34,662 (7)	59,272	—	—
	5/9/2021	—	—	—	—	15,000 (9)	25,650	—	—

(1) The market value of the restricted stock awards is based on the closing market price of our common stock as of December 31, 2021, which was $1.71 per share.

(2) Vested 100% on August 16, 2017.

(3) Vested 100% on November 16, 2017.

(4) Represents a grant of restricted stock units, of which 25% vested on December 1, 2019, 2020, and 2021, and 25% vests on December 1, 2022.

(5) Represents a grant of restricted stock units that are subject to performance-based vesting requirements, measured quarterly, based on the average of (a) the average high daily trading price of Resonant common stock for each trading day during the last month of the applicable calendar quarter and (b) the average low daily trading price of Resonant common stock for each trading day during the last month of the applicable calendar quarter, each as reported by The Nasdaq Stock Market, LLC (the "Applicable Share Price"). The RSUs are eligible to be earned on a quarterly basis based on a linear interpolation of the Applicable Share Price between $5 per share (0% of the RSUs) and $20 per share (100% of the RSUs). Once earned, the RSUs vest and become exercisable, if at all, (y) 50% on the date such RSUs become earned and (z) 50% on September 30, 2022.

(6) Represents a grant of restricted stock units, of which 25% vested on December 1, 2020 and 2021, and 25% vests on each of December 1, 2022 and December 1, 2023.

(7) Represents a grant of restricted stock units, of which 25% vested on December 1, 2021 and 25% vests on each of December 1, 2022, 2023, and 2024.

(8) Vested 5,000 shares on May 28, 2014 and 700 shares on June 30, 2014, September 30, 2014, December 31, 2014, March 31, 2015, June 30, 2015, September 30, 2015, December 31, 2015, March 31, 2016, June 30, 2016 and September 30, 2016.

(9) Represents a grant of restricted stock units, of which 25% vested on May 13, 2021, 25% vested on December 1, 2021, and 25% vests on each of December 1, 2022, and 2023.

Executive Officer Employment Letters

We entered into an executive employment letter, dated February 9, 2016, with George Holmes, an executive employment letter, dated October 14, 2018, with Martin McDermut and an executive employment letter, dated November 14, 2019, with Dylan Kelly. The letters have no specific duration and provide for at-will employment. Each of our named executive officers may be entitled to receive severance benefits under a severance and change in control agreement, as described below.

Severance and Change in Control Agreements

We have entered into severance and change in control agreements with participating employees, including our named executive officers, which provide these employees with severance benefits upon the employee's termination of employment in certain circumstances with certain additional benefits following a change in control of Resonant. These benefits provide the participating employees with enhanced financial security and incentive to remain with Resonant notwithstanding their at-will employment with us and the possibility of a change in control.

Termination Without Change in Control

If we terminate the participant's employment with Resonant for a reason other than cause, the participant becoming disabled or the participant's death, and the termination does not occur within twenty-four months immediately following a "change in control," the participant will receive the following severance benefits:

Accrued Compensation: The participant will receive all accrued but unpaid paid time off, expense reimbursements, wages, and other benefits due to the participant under any Resonant -provided plans, policies, and arrangements.

Severance Payment: All participants will receive severance for a specified number of months of the participant's base salary then in effect immediately prior to the date of the participant's termination of employment, less all required tax withholdings and other applicable deductions, payable as soon as practicable following the participant's termination of employment. Messrs. Holmes, McDermut and Kelly, our named executive officers, are each entitled to receive 18 months of base salary severance.

Target Bonus Payment: The participant will receive a lump-sum severance payment equal to 100% of the participant's full target bonus as in effect for the fiscal year in which the termination occurs, which amount for all participants other than the CEO will be pro-rated for the portion of the fiscal year that the participant was employed by us.

Continued Health Insurance Benefits: We will reimburse the participant for premiums for coverage of the participant and his or her eligible dependents pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA") (at the coverage levels in effect immediately prior to termination of employment) until the earliest to occur of (A) a period of twelve (12) months from the last date of employment with us, (B) the date upon which the participant becomes eligible for coverage under a health, dental, or vision insurance plan of a subsequent employer, and (C) the date the participant or his or her dependents cease to be eligible for COBRA coverage.

Equity: All of the participant's unvested and outstanding equity awards that would have become vested had the participant remained in our employ for the twelve (12) month period following termination of employment shall immediately vest and become exercisable as of the date of termination, and the participant will have six months following termination of employment in which to exercise any stock options, stock appreciation rights, or similar rights to acquire our common stock.

Outplacement Benefits. If requested by the participant, we will pay the expense for outplacement benefits provided by a service to be determined by us for a period of six (6) months, up to a maximum dollar value of five thousand dollars ($5,000) per participant.

Termination Following Change in Control

If during the twenty-four (24) month period immediately following a change in control of Resonant, (x) we terminate the participant's employment with us for a reason other than cause, the participant becoming disabled or the participant's death, or (y) the participant resigns his employment for good reason, then the participant will receive the following benefits from us in lieu of the benefits described above under "*Termination Without Change in Control*":

Accrued Compensation: The participant will receive all accrued but unpaid paid time off, expense reimbursements, wages, and other benefits due to the participant under any Resonant -provided plans, policies, and arrangements.

Severance Payment: All participants will receive severance for a specified number of months of the participant's base salary then in effect. Messrs. Holmes, McDermut and Kelly, our named executive officers, are each entitled to receive 18 months of base salary severance.

Target Bonus Payment: The participant will receive a lump sum severance payment equal to 100% of the participant's full target bonus for the fiscal year in effect at the date of such termination of employment (or, if greater, as in effect for the fiscal year in which the change in control occurs).

Continued Health Insurance Benefits: We will reimburse the participant for premiums for coverage of the participant and his or her eligible dependents pursuant to the COBRA (at the coverage levels in effect immediately prior to termination of employment) until the earliest to occur of (A) a period of twelve (12) months from the last date of employment with us, (B) the

date upon which the participant becomes eligible for coverage under a health, dental, or vision insurance plan of a subsequent employer, and (C) the date the participant or his or her dependents cease to be eligible for COBRA coverage.

Equity: All of the participant's unvested and outstanding equity awards shall immediately vest and become exercisable as of the date of termination, and the participant will have six (6) months following termination of employment in which to exercise any stock options, stock appreciation rights, or similar rights to acquire our common stock.

Outplacement Benefits. If requested by the participant, we will pay the expense for outplacement benefits provided by a service to be determined by us for a period of six (6) months, up to a maximum dollar value of five thousand dollars ($5,000) per participant.

Pension Benefits and Nonqualified Deferred Compensation

We do not provide a pension plan for our employees, and none of our named executive officers participated in a nonqualified deferred compensation plan in 2021.

401(k) Plan

We maintain a tax-qualified retirement plan, or the 401(k) plan, that provides eligible employees with an opportunity to save for retirement on a tax-advantaged basis. Eligible employees are able to participate in the 401(k) plan as of the first day of the month following the date they meet the 401(k) plan's eligibility requirements, and participants are able to defer up to 100% of their eligible compensation subject to applicable annual Code limits. All participants' interests in their deferrals are 100% vested when contributed. The 401(k) plan permits us to make matching contributions and profit sharing contributions to eligible participants. We have implemented a matching program, which is limited to 5% of base salary. In 2021, we made matching contributions of $524,000 into the plan.

Non-employee Director Compensation

Director Compensation Table

The following table details the total compensation earned by our non-employee directors in fiscal year 2021:

Director	Fees Earned or Paid in Cash	Stock Awards[1][2][3][4]	All Other Compensation		Total
Rubén Caballero	$ 50,000	$ 130,000	$ 150,000	(5)	$ 330,000
Michael Fox	$ 113,000	$ 280,000	$ —		$ 393,000
Alan Howe	$ 57,500	$ 144,000	$ —		$ 201,500
Jack Jacobs	$ 59,000	$ 144,000	$ —		$ 203,000
Joshua Jacobs	$ 59,000	$ 144,000	$ —		$ 203,000
Jean Rankin	$ 67,500	$ 172,000	$ —		$ 239,500
Robert Tirva	$ 69,000	$ 172,000	$ —		$ 241,000

(1) Represents awards of restricted stock units, each of which entitles the director to receive one share of our common stock at the time of vesting, without the payment of an exercise price or other cash consideration.

(2) These amounts represent the grant date fair value of the stock awards granted in fiscal year 2021 determined in accordance with ASC Topic 718. These amounts may not correspond to the actual value eventually realized by the director, which depends in part on the market value of our common stock in future periods. Assumptions used in calculating these amounts are set forth in the Notes to Consolidated Financial Statements included in this annual report on Form 10-K.

(3) On May 10, 2021, each of Ms. Rankin and Mr. Tirva received an award of restricted stock units for 35,000 shares of our common stock, Messrs. Jack Jacobs, Joshua Jacobs, and Howe received an award of restricted stock units for 25,000 shares of our common stock, Mr. Fox received an award of restricted stock units for 65,000 shares of our common stock, and Mr. Caballero received an award of restricted stock units for 20,000 shares of our common stock, which awards will vest 50% on May 10, 2022 and 50% on May 10, 2023.

(4) On June 8, 2021, upon their reelection to the board, each of Ms. Rankin and Messrs. Jack Jacobs, Joshua Jacobs, Howe, Caballero and Tirva received an award of restricted stock units for 19,788 shares of our common stock, and Mr. Fox received an award of restricted stock units for 26,385 shares of our common stock, which awards vest and settle 50% on the earlier of the day prior to the first annual meeting of stockholders following the grant and June 8, 2022, and 50% on the earlier of the day prior to the second annual meeting of stockholders following the grant and June 8, 2023. As of December 31, 2021, the non-employee directors who served during fiscal 2021 held restricted stock units for the following number of shares of our common stock: Mr. Caballero - 52,499; Mr. Fox - 108,334; Mr. Howe - 57,499; Mr. Jack Jacobs - 57,499; Mr. Joshua Jacobs - 57,499; Ms. Rankin - 67,499 and Mr. Tirva - 67,499. Restricted stock units generally vest in two installments of 50% each on the first and second anniversaries of the date of grant.

(5) Consists of fees for technical advisory services provided by Mr. Caballero during fiscal year 2021, comprised of $50,000 paid in cash and $100,000 paid in restricted stock units for 32,154 shares of our common stock that vested 100% on December 31, 2021. The dollar amount paid in restricted stock units represents the grant date fair value of the award determined in accordance with ASC Topic 718. The amount may not correspond to the actual value eventually realized by Mr. Caballero, which depends in part on the market value of our common stock in future periods. Assumptions used in calculating the amount are set forth in the Notes to Consolidated Financial Statements included in this annual report on Form 10-K.

Outside Director Compensation Policy

Our board of directors has adopted a policy for the compensation for our non-employee directors, or the Outside Directors. Outside Directors will receive compensation in the form of equity granted under the terms of the Resonant Inc. Amended and Restated 2014 Omnibus Incentive Plan, as amended to date (the "2014 Plan") and cash, as described below:

Initial award to Outside Directors. Each person who first becomes an Outside Director will be granted 24,000 restricted stock units, or the Initial RSU Award. These awards will be granted on the date of the first meeting of our board of directors or compensation committee occurring on or after the date on which the individual first became an Outside Director or commenced service as chairman or lead independent director. The shares underlying the Initial RSU Award will vest as to one-half of the shares subject to such award on each of the first and second anniversary of the commencement of the individual's service as an Outside Director, subject to continued service as a director through the applicable vesting date. If a director's status changes from an employee director to an Outside Director, he or she will not receive an Initial RSU Award.

Initial award to chairman or lead independent director. An Outside Director, upon first becoming chairman of the board or lead independent director, will be granted a restricted stock unit with a grant date fair value equal to $25,000, pro-rated based on the number of days remaining from the date on which such Outside Director first becomes chairman or lead independent director until the first anniversary of our last annual meeting of stockholders. One-half of the shares underlying this award will vest on the earlier of (i) the day prior to the first annual meeting of stockholders following the grant or (ii) one year from grant, and one-half of the shares underlying this award will vest on the earlier of (i) the day prior to the second annual meeting of stockholders following the grant or (ii) two years from grant, subject to continued service as chairman of the board and/or lead independent director through the applicable vesting date.

Annual award to Outside Directors. On the date of each annual meeting of our stockholders, each Outside Director who has served on our board of directors for at least the preceding six months will be granted restricted stock units with a grant date fair value equal to $75,000, or the Annual RSU Award. One-half of the shares underlying the Annual RSU Award will vest on the earlier of (i) the day prior to the first annual meeting of stockholders following the grant or (ii) one year from grant, and one-half of the shares underlying the Annual RSU Award will vest on the earlier of (i) the day prior to the second annual meeting of stockholders following the grant or (ii) two years from grant, subject to continued service as a director through the applicable vesting date.

Annual award to chairman or lead independent director. On the date of each annual meeting of our stockholders, an Outside Director who has served as chairman of the board or lead independent director for at least the preceding six months will be granted, in addition to the Annual RSU Award, restricted stock units with a grant date fair value equal to $25,000. One-half of the shares underlying this award will vest on the earlier of (i) the day prior to the first annual meeting of stockholders following the grant or (ii) one year from grant, and one-half of the shares underlying this award will vest on the earlier of (i) the day prior to the second annual meeting of stockholders following the grant or (ii) two years from grant, subject to continued service as chairman of the board and/or lead independent director through the applicable vesting date.

Cash compensation. Each Outside Director receives an annual retainer of $50,000 in cash for serving on our board of directors, or the Annual Fee. The Outside Director who serves as chairman of the board or lead independent director will receive an additional annual cash retainer of $50,000. Each Outside Director who serves as a member or chairperson of the audit, compensation, or nominating and corporate governance committee of the board also receives the following additional cash compensation:

Committee	Chair	Member (Excluding Chair)
Audit	$ 15,000	$ 7,500
Compensation	$ 10,000	$ 5,000
Nominating and Corporate Governance	$ 8,000	$ 4,000

All cash compensation is paid in quarterly installments to each Outside Director who has served in the relevant capacity for the immediately preceding fiscal quarter no later than 30 days following the end of such preceding fiscal quarter. An Outside Director who has served in the relevant capacity for only a portion of the immediately preceding fiscal quarter will receive a prorated payment of the applicable fee.

Technical Advisory Arrangement with Rubén Caballero

In addition to his service on our board of directors, we have engaged Mr. Caballero as a technical advisor pursuant to a Technical Advisor Agreement, dated as of August 5, 2019. In consideration for his advisory services, we have agreed to pay

Mr. Caballero $50,000 per year, payable in cash in monthly installments, and $100,000 in restricted stock units upon his appointment (which vested on January 1, 2020) and $100,000 in restricted stock units in January of each year thereafter that Mr. Caballero is providing technical advisory services to Resonant (which will vest on December 31 of the year of grant).

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

Security Ownership of Certain Beneficial Owners and Management

The following table sets forth certain information with respect to the beneficial ownership of our common stock for:

- each of our named executive officers;
- each of our directors;
- all of our executive officers and directors as a group; and
- each person, or group of affiliated persons, who beneficially owned more than 5% of our common stock.

We have determined beneficial ownership in accordance with the rules of the SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Except as indicated by the footnotes below, we believe, based on information furnished to us, that the persons and entities named in the table below have sole voting and sole investment power with respect to all shares of common stock that they beneficially owned, subject to applicable community property laws.

The information for each beneficial owner is as of March 14, 2022, unless otherwise indicated for greater than five percent (5%) stockholders who are not officers or directors of Resonant. We have based percentage ownership of our common stock on 67,186,080 shares of our common stock outstanding as of March 14, 2022. In computing the number of shares of common stock beneficially owned by a person and the percentage ownership of such person, we deemed to be outstanding all shares of common stock subject to options held by the person that are currently exercisable or exercisable within 60 days of March 14, 2022, as well as all shares of common stock issuable pursuant to restricted stock units held by the person that are subject to vesting conditions expected to occur within 60 days of March 14, 2022. However, we did not deem such shares outstanding for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated, the address of each beneficial owner listed in the table below is c/o Resonant Inc., 10900 Stonelake Blvd, Suite 100, Office 02-130, Austin, TX 78759.

	Common Stock Beneficially Owned	
Name of Beneficial Owner	**Number**	**Percentage**
Named Executive Officers and Directors:		
George Holmes [1]	540,923	*
Martin McDermut [2]	283,825	*
Dylan Kelly [3]	174,197	*
Rubén Caballero [4]	164,462	*
Michael Fox [5]	2,153,668	3.2 %
Alan Howe [6]	81,684	*
Jack Jacobs [7]	76,684	*
Joshua Jacobs[8]	80,184	*
Jean Rankin[9]	91,012	*
Robert Tirva [10]	81,684	*
All executive officers and directors as a group (13 persons)[11]	4,700,467	7.0 %
Other 5% Stockholders:		
AWM Investment Company Inc. [12]	3,761,840	5.6 %

*Represents beneficial ownership of less than one percent.

(1) Consists of (i) 527,436 shares of common stock, and (ii) 13,487 shares of common stock that may be acquired from us upon exercise of stock options that are exercisable within 60 days of March 14, 2022.

(2) Consists of (i) 271,825 shares of common stock, and (ii) 12,000 shares of common stock that may be acquired from us upon exercise of stock options that are exercisable within 60 days of March 14, 2022.

(3) Consists of 174,197 shares of common stock,.

(4) Consists of 154,462 shares of common stock, and (ii) 10,000 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(5) Consists of (i) 121,168 shares of common stock, (ii) 32,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022, and (iii) 2,000,000 shares of common stock owned by Park City Capital Offshore Master Ltd.

(6) Consists of (i) 69,184 shares of common stock, and (ii) 12,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(7) Consists of (i) 64,184 shares of common stock, and (ii) 12,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(8) Consists of (i) 67,684 shares of common stock, and (ii) 12,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(9) Consists of (i) 73,512 shares of common stock, and (ii) 17,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(10) Consists of (i) 64,184 shares of common stock, and (ii) 17,500 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(11) Consists of (i) 4,461,884 shares of common stock, (ii) 117,333 shares of common stock that may be acquired from us upon exercise of stock options that are exercisable within 60 days of March 14, 2022, and (iii) 121,250 shares of common stock that are issuable pursuant to restricted stock units that are subject to vesting conditions that are expected to occur within 60 days of March 14, 2022.

(12) Based on information set forth in a Schedule 13G filed with the SEC on February 11, 2022 by AWM Investment Company, Inc. with an address at c/o Special Situations Funds, 527 Madison Avenue, Suite 2600, New York, NY 10022.

Equity Compensation Plan Information

The following table summarizes certain information about our equity compensation plans as of December 31, 2021.

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights	Weighted Average Exercise Price of Outstanding Options, Warrants and Rights [1]	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities in Column A)
Equity compensation plans approved by security holders [2]	4,371,704	$ 4.60	3,259,944
Equity compensation plans not approved by security holders	—	—	—
Total	4,371,704	$ 4.60	3,259,944

(1) The weighted average exercise price is calculated based solely on outstanding stock options. It does not take into account restricted stock units, which have no exercise price.

(2) Consists of the Amended and Restated 2014 Omnibus Incentive Plan, as amended.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Reportable Related Party Transactions

We describe below transactions, and series of related transactions, since January 1, 2020 to which we were or will be a party, in which:

- the amounts involved exceeded or will exceed $120,000; and
- any of our directors, executive officers, or beneficial holders of more than 5% of any class of our capital stock, or their immediate family members, had or will have a direct or indirect material interest.

Other than as described below, there has not been, nor is there any currently proposed, transaction or series of related transactions to which we have been or will be a party other than compensation arrangements, which are described where required under the headings “Board of Directors and Corporate Governance - Director Compensation Table” and “Executive Compensation.”

Indemnification Agreements

We have entered into indemnification agreements with each of our current and former directors and executive officers and certain key employees. The indemnification agreements and our amended and restated certificate of incorporation and amended and restated bylaws require us to indemnify our current and former directors and officers to the fullest extent permitted by Delaware law.

Policies and Procedures for Related Party Transactions

Our audit committee has the primary responsibility for reviewing and approving or disapproving "related party transactions," which are transactions between us and related persons in which the aggregate amount involved exceeds or may be expected to exceed $120,000 and in which a related person has or will have a direct or indirect material interest. Our policy regarding transactions between us and related persons provides that a related person is defined as a director, executive officer, nominee for director or greater than 5% beneficial owner of our common stock, in each case since the beginning of the most recently completed year, and any of their immediate family members. Our audit committee charter provides that our audit committee shall review and approve or disapprove any related party transactions.

Director Independence

Our common stock is listed on the NASDAQ Capital Market. Under the rules of NASDAQ, independent directors must comprise a majority of a listed company's board of directors. In addition, the rules of NASDAQ require that, subject to specified exceptions, each member of a listed company's audit, compensation and nominating and governance committees be independent. Under the rules of NASDAQ, a director will only qualify as an ''independent director'' if, in the opinion of that company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director.

Our board of directors has undertaken a review of the independence of each director and considered whether each director has a material relationship with us that could compromise such director's ability to exercise independent judgment in carrying out his or her responsibilities. As a result of this review, our board of directors has determined that Messrs. Fox, Howe, Jack Jacobs, Joshua Jacobs and Tirva, and Ms. Rankin are ''independent directors'' as defined under the applicable rules and regulations of the SEC and the listing requirements and rules of NASDAQ. Because Mr. Holmes is employed by Resonant, he does not qualify as independent. Additionally, the Board concluded that Mr. Caballero does not qualify as independent due to the nature and significance of his consulting relationship with Resonant.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Fees Paid to Independent Registered Public Accounting Firms

On August 19, 2020, we appointed KPMG, LLP as our independent registered public accounting firm. KPMG LLP replaced Crowe LLP, which had served as our independent registered public accounting firm since June 2015.

The following table presents fees billed to us by KPMG LLP for professional services rendered during fiscal years ended December 31, 2021 and 2020.

	2021	2020
Audit Fees [1]	$ 355,500	$ 376,153
Audit-Related Fees [2]	190,000	140,131
Tax Fees [3]	30,125	29,875
All Other Fees	—	—
Total Fees	$ 575,625	$ 546,159

(1) "Audit Fees" consist of fees for professional services rendered in connection with the audit of our annual consolidated financial statements, including audited financial statements presented in our From 10-K for the years ended December 31, 2021 and December 31, 2020, review of our quarterly financial statements presented in our quarterly reports during 2021 and 2020, and services that are normally provided by our independent registered public accounting firm in connection with statutory and regulatory filings or engagements for that fiscal year.

(2) "Audit-Related Fees" consist of fees for professional services that are reasonably related to the performance of the audit or review of the company's financial statements. Audit-related fees also consisted of fees for professional services rendered in connection with the registration of shares pursuant to registration statements on Form S-3 that we filed with the SEC during the fiscal year ended December 31, 2021, and fees for professional services rendered in connection with our sale of shares under our at-the-market offering during the fiscal years ended December 31, 2021 and 2020.

(3) "Tax Fees" consist of professional services rendered in connection with tax audits, tax compliance, and tax consulting and planning.

The following table presents fees billed to us by Crowe LLP for professional services rendered during the fiscal year ended December 31, 2020.

		2020
Audit Fees [1]	$	51,153
Audit-Related Fees [2]		105,131
Tax Fees		—
All Other Fees		—
Total Fees	$	156,284

(1) "Audit Fees" consist of fees for professional services rendered in connection with the review of our quarterly financial statements presented in our quarterly reports during 2020, and services that are normally provided by our independent registered public accounting firm in connection with statutory and regulatory filings or engagements for 2020.

(2) "Audit-Related Fees" consist of fees for professional services that are reasonably related to the performance of the audit or review of the company's financial statements. Audit-related fees also consisted of fees for professional services rendered in connection with the registration of shares pursuant to registration statements on Form S-3 and Form S-8 that we filed with the SEC during the fiscal year, and fees for professional services rendered in connection with our sale of shares in underwritten public offerings during the fiscal year.

(3) "Tax Fees" consist of professional services rendered in connection with tax audits, tax compliance, and tax consulting and planning.

Audit Committee Policy on Pre-Approval of Audit and Permissible Non-Audit Services

Consistent with requirements of the SEC and the Public Company Accounting Oversight Board, or PCAOB, regarding auditor independence, our audit committee is responsible for the appointment, compensation and oversight of the work of our independent registered public accounting firm. In recognition of this responsibility, our audit committee has a policy for the pre-approval of all audit and permissible non-audit services provided by the independent registered public accounting firm. These services may include audit services, audit-related services, tax services and other services.

Before engagement of the independent registered public accounting firm for the next fiscal year's audit, the independent registered public accounting firm submits to the audit committee for approval a detailed description of services expected to be rendered during that year for each of the following categories of services:

- *Audit services*. Audit services include the annual financial statement audit (including required quarterly reviews) and other procedures required to be performed by the independent auditor to form an opinion on our consolidated financial statements. Audit services also include, as necessary, the attestation engagement for the independent auditor's report on management's report on internal controls for financial reporting. Other audit services may include services associated with SEC registration statements, periodic reports and other documents filed with the SEC.
- *Audit-related services*. Audit-related services are assurance and related services that are reasonably related to the performance of the audit or review of our financial statements or that are traditionally performed by the independent auditor.
- *Tax Services.* Tax services include services related to tax compliance, tax planning and tax advice.
- *All Other Services.* All other services are those services not described in the other categories that are not prohibited by SEC rules.

The audit committee pre-approves particular services or categories of services on a case-by-case basis. During the year, circumstances may arise when it may become necessary to engage the independent registered public accounting firm for additional services not contemplated in the original pre-approval. In those instances, the services must be pre-approved by the audit committee, or as permitted, the audit committee chair, before the independent registered public accounting firm is engaged. Pre-approval fee levels or budgeted amounts for all services to be provided by the independent registered public accounting firm are established annually by the audit committee. Any proposed services exceeding these levels or amounts require specific pre-approval by the audit committee, or the audit committee chair. All fees paid for the fiscal years ended December 31, 2021 and 2020 were pre-approved by the audit committee in accordance with the process described in the policy above.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

We have filed the following documents as part of this Annual Report on Form 10-K:

1. Consolidated Financial Statements

   Our consolidated financial statements are listed in the "Index to Consolidated Financial Statements" under Part II, Item 8 of this Annual Report on Form 10-K.

2. Financial Statement Schedules

   All schedules have been omitted because they are not required, not applicable, not present in amounts sufficient to require submission of the schedule, or the required information is otherwise included in our consolidated financial statements and related notes.

3. Exhibits

The following exhibits are filed as part of this Annual Report on Form 10-K.

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File Number	Exhibit	Filing Date	
2.1***	Agreement and Plan of Merger, dated as of February 14, 2022, by and among Resonant Inc., Murata Electronics North America, Inc. and PJ Cosmos Acquisition Company, Inc.	8-K	001-36467	2.1	2/14/2022	
3.1.1	Amended and Restated Certificate of Incorporation of the Registrant	8-K	001-36467	3.1	6/5/2014	
3.1.2	Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the Registrant	8-K	001-36467	3.1	6/12/2019	
3.2	Amended and Restated Bylaws of the Registrant	8-K	001-36467	3.2	6/5/2014	
4.1	Form of the Registrant's common stock certificate	S-1/A	333-193552	4.1	4/11/2014	
10.1*	Form of Indemnification Agreement between the Registrant and each of its directors and officers	S-1	333-193552	10.1	1/24/2014	
10.2.1*	Registrant's Amended and Restated 2014 Omnibus Incentive Plan	S-1/A	333-193552	10.2	4/11/2014	
10.2.2*	Amendment No. 1 to Registrant's Amended and Restated 2014 Omnibus Incentive Plan	S-8	333-211893	10.1	6/7/2016	
10.2.3*	Amendment No. 2 to Registrant's Amended and Restated 2014 Omnibus Incentive Plan	S-8	333-218542	10.3	6/7/2017	
10.2.4*	Amendment No. 3 to Registrant's Amended and Restated 2014 Omnibus Incentive Plan	8-K	001-36467	10.1	6/12/2019	
10.2.5*	Amendment No. 4 to Registrant's Amended and Restated 2014 Omnibus Incentive Plan	8-K	001-36467	10.1	6/10/2020	
10.3*	Offer Letter between the Registrant and Neal Fenzi, dated June 17, 2013	S-1	333-193552	10.5	1/24/2014	
10.4*	Offer Letter between the Registrant and George B. Holmes, dated February 9, 2016	8-K	001-36467	10.1	3/4/2016	

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File Number	Exhibit	Filing Date	
10.5*	Offer Letter between the Registrant and Martin S. McDermut, dated October 14, 2018	8-K	001-36467	10.1	11/5/2018	
10.6*	Offer Letter between the Registrant and Dylan J. Kelly, dated November 14, 2019	8-K	001-36467	10.1	12/2/2019	
10.7*	Form of Severance and Change in Control Agreement					X
10.8*	Amended and Restated Restricted Stock Unit Agreement, dated June 11, 2019, between the Registrant and George B. Holmes	8-K	001-36467	10.2	6/12/2019	
10.9*	Restricted Stock Unit Agreement, dated December 2, 2019, between the Registrant and Dylan J. Kelly	8-K	001-36467	10.2	12/2/2019	
10.10*	Outside Director Compensation Policy	10-K	001-36467	10.1	3/12/2021	
10.11.1	Standard Commercial Lease, dated May 14, 2018, between the Registrant and University Business Center Associates	8-K	001-36467	10.1	5/17/2018	
10.11.2	First Amendment to Standard Commercial Lease, dated May 1, 2020, between the Registrant and 175 Cremona Canwood, LLC	10-K	001-36467	10.11.2	3/12/2021	
10.12	Sublease Agreement, dated as of September 10, 2021, between Resonant Inc. and Sonim Technologies Inc.	10-Q	001-36467	10.2	11/10/2021	
10.13*	Amended and Restated Severance and Change in Control Agreement, dated as of December 21, 2017, by and between the Registrant and George B. Holmes	8-K	001-36467	10.2	12/26/2017	
10.14*	Technical Advisor Agreement, dated as of August 5, 2019, between the Registrant and Ruben Caballero	10-K	001-36467	10.19	3/13/2020	
10.15.1**	Collaboration and License Agreement, dated as of September 30, 2019, by and between the Registrant and Murata Manufacturing Co., Ltd.	10-Q	001-36467	10.1	11/7/2019	
10.15.2**	Addendum 1 to Collaboration and License Agreement, dated as of September 30, 2021, between the Registrant and Murata Manufacturing Co., Ltd.	10-Q	001-36467	10.1	11/10/2021	
10.16	At-The-Market Equity Offering Sales Agreement, dated as of August 14, 2020 between the Registrant and Stifel, Nicolaus & Company Incorporated	8-K	001-36467	1.1	8/14/2020	
21.1	List of Subsidiaries	10-K	001-36467	21.1	3/30/2017	
23.1	Consent of KPMG LLP					X
24.1	Power of Attorney (included on signature page)					X
31.1	Certification of Principal Executive Officer Pursuant to Securities Exchange Act Rules 13a-14(a) and 15d-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File Number	Exhibit	Filing Date	
31.2	Certification of Principal Financial Officer Pursuant to Securities Exchange Act Rules 13a-14(a) and 15d-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X
32.1#	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
101.INS	XBRL Instance Document					X
101.SCH	XBRL Taxonomy Extension Schema Document					X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					X

* Each a management contract or compensatory plan or arrangement required to be filed as an exhibit to this annual report on Form 10-K.

** Portions of this exhibit have been omitted pursuant to Rule 601(b)(10)(iv) of Regulation S-K.

*** The Company will furnish supplementally a copy of any omitted schedule or exhibit to the SEC upon request; provided, however, that the Company may request confidential treatment pursuant to Rule 24b-2 of the Securities Exchange Act of 1934, as amended, for any schedule or exhibit so furnished.

The information in this exhibit is furnished and deemed not filed with the Securities and Exchange Commission for purposes of section 18 of the Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of Resonant Inc. under the Securities Act of 1933, as amended, or the Exchange Act of 1934, as amended, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

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 has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Dated: March 14, 2022

Resonant Inc.

By: /s/ MARTIN S. MCDERMUT
MARTIN S. MCDERMUT
Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints George B. Holmes and Martin S. McDermut, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution for him or her, and in his or her name in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, and any of them or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

Signature	Title	Date
/s/ George B. Holmes George B. Holmes	Chief Executive Officer and Chairman of the Board of Directors *(Principal Executive Officer)*	March 14, 2022
/s/ Martin S. McDermut Martin S. McDermut	Chief Financial Officer and Secretary *(Principal Financial Officer)*	March 14, 2022
/s/ Lisa Wolf Lisa Wolf	Chief Accounting Officer *(Principal Accounting Officer)*	March 14, 2022
/s/ Michael J. Fox Michael J. Fox	Director	March 14, 2022
/s/ Alan Howe Alan Howe	Director	March 14, 2022
/s/ Joshua Jacobs Joshua Jacobs	Director	March 14, 2022
/s/ Jack Jacobs Jack Jacobs	Director	March 14, 2022
/s/ Jean Rankin Jean Rankin	Director	March 14, 2022
/s/ Robert Tirva Robert Tirva	Director	March 14, 2022
/s/ Ruben Caballero Ruben Caballero	Director	March 14, 2022

Exhibit 10.7

SEVERANCE AND CHANGE IN CONTROL AGREEMENT

This Severance and Change in Control Agreement (the "***Agreement***") is made and entered into by and between [_____] ("***Executive***") and Resonant Inc., a Delaware corporation (the "***Company***"), effective as of the Executive's first date of employment with the Company (the "***Effective Date***"). Certain capitalized terms used in the Agreement are defined in Section 6 below.

RECITALS

A. The Compensation Committee (the "***Committee***") of the Board of Directors of the Company (the "***Board***") recognizes that it is possible that the Company could terminate Executive's employment with the Company and from time to time the Company may consider the possibility of an acquisition by another company or other change in control transaction. The Committee also recognizes that such considerations can be a distraction to Executive and can cause Executive to consider alternative employment opportunities. The Committee has determined that it is in the best interests of the Company and its stockholders to assure that the Company will have the continued dedication and objectivity of Executive, notwithstanding the possibility, threat or occurrence of such a termination of employment or the occurrence of a Change in Control (as defined herein) of the Company.

B. The Committee believes that it is in the best interests of the Company and its stockholders to provide Executive with an incentive to continue his or her employment with the Company and to motivate Executive to maximize the value of the Company for the benefit of its stockholders.

C. The Committee believes that it is imperative to provide Executive with certain severance benefits upon Executive's termination of employment and with certain additional benefits following a Change in Control. These benefits will provide Executive with enhanced financial security and incentive and encouragement to remain with the Company notwithstanding the possibility of a Change in Control.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the parties hereto agree as follows:

1. Term of Agreement. This Agreement will not terminate until all of the obligations of the parties hereto with respect to this Agreement have been satisfied.

2. At-Will Employment. The Company and Executive acknowledge that Executive's employment is and will continue to be at-will, as defined under applicable law. If Executive's employment terminates for any reason, including (without limitation) any termination of employment not set forth in Section 3, Executive will not be entitled to any payments, benefits, damages, awards or compensation other than (a) the payment of accrued but unpaid wages, as required by law, and any unreimbursed reimbursable expenses and (b) payments, benefits, damages, awards or other compensation provided for pursuant to this Agreement or pursuant to other written agreements with the Company, including equity award agreements.

3. Severance Benefits.

(a) Termination without Cause or Resignation for Good Reason in Connection with a Change in Control. If during the three (3) month period immediately prior to or at any time within the twenty-four (24)-month period immediately following a Change in Control, (x) the Company terminates Executive's employment with the Company for a reason other than Cause, Executive becoming Disabled or Executive's death, or (y) Executive resigns

from such employment for Good Reason, then, subject to Section 4, Executive will receive the following severance benefits from the Company:

(i) Accrued Compensation. The Company will pay Executive all accrued but unpaid vacation pay, expense reimbursements, wages, and other benefits due to Executive under any Company-provided plans, policies, and arrangements.

(ii) Severance Payment. Executive will receive a lump sum severance payment equal to eighteen (18) months of Executive's base salary as in effect immediately prior to the date of Executive's termination of employment, less all required tax withholdings and other applicable deductions, which will be paid as soon as practicable following Executive's termination of employment but in no event later than the next pay period following Executive's termination of employment.

(iii) Target Bonus Payment. Executive will receive a lump sum severance payment equal to one hundred percent (100%) of Executive's full target bonus for the fiscal year in effect at the date of such termination of employment (or, if greater, as in effect for the fiscal year in which the Change in Control occurs), less all required tax withholdings and other applicable deductions. The target bonus is the amount Executive would be entitled to receive if all of Executive's baseline goals for the applicable fiscal year are achieved. The target bonus will be paid as soon as practicable following Executive's termination of employment but in no event later than the next pay period following Executive's termination of employment.

(iv) Continued Health Insurance Benefits. If Executive is eligible for, and elects continuation coverage pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("***COBRA***") for Executive and Executive's eligible dependents (as applicable) under a health, dental, or vision plan sponsored by the Company, within the time period prescribed pursuant to COBRA, the Company will reimburse Executive, as and when due to the COBRA carrier, for the COBRA premiums for such coverage for Executive and his eligible dependents (at the coverage levels in effect immediately prior to Executive's termination of employment) until the earliest to occur of (A) a period of twelve (12) months from the last date of employment of Executive with the Company, (B) the date upon which Executive becomes eligible for coverage under a health, dental, or vision insurance plan of a subsequent employer, and (C) the date Executive or, in the case of a coverage for a dependent of Executive, the applicable dependent, ceases to be eligible for COBRA coverage. These payments will be subject to any applicable tax withholdings (including tax withholdings necessary to ensure that the provision of this benefit is not deemed a discriminatory practice giving rise to penalties to the Company under applicable laws) and will be counted as coverage pursuant to COBRA to the maximum extent permitted under applicable law.

(v) Equity. Executive will be entitled to accelerated vesting as to one hundred percent (100%) of the then unvested portion of all of Executive's outstanding equity awards. In addition, Executive will have six (6) months following any such termination of employment in which to exercise any stock options, stock appreciation rights, or similar rights to acquire Company common stock, but in no event will such equity award be permitted to be exercised beyond the earlier of the original maximum term of such equity award or ten (10) years from the original grant date of such equity award.

(vi) Outplacement Benefits. If requested by Executive, the Company will pay the expense for outplacement benefits provided by a service to be determined by the Company in its discretion for a period of six (6) months, up to a maximum dollar value of five thousand dollars ($5,000) following Executive's termination.

(vii) Payments or Benefits Required by Law. Executive will receive such other compensation or benefits from the Company as may be required by law.

(b) Termination without Cause and not in Connection with a Change in Control. If the Company terminates Executive's employment with the Company for a reason

other than Cause, Executive becoming Disabled or Executive's death at any time other than during the twenty-four (24)-month period immediately following a Change in Control, then, subject to Section 4, Executive will receive the following severance benefits from the Company:

(i) Accrued Compensation. The Company will pay Executive all accrued but unpaid vacation time, expense reimbursements, wages, and other benefits due to Executive under any Company-provided plans, policies, and arrangements.

(ii) Severance Payment. Executive will receive severance in an amount equal to eighteen (18) months of Executive's base salary as in effect immediately prior to the date of Executive's termination of employment, less all required tax withholdings and other applicable deductions, which will be paid as soon as practicable following Executive's termination of employment but in no event later than the next pay period after Executive's termination of employment.

(iii) Pro-Rated Target Bonus Payment. Executive will receive a lump-sum severance payment equal to one hundred percent (100%) of Executive's full target bonus as in effect for the fiscal year in which Executive's termination occurs, pro-rated by multiplying such bonus amount by a fraction, the numerator of which shall be the number of days from and including the first day of such fiscal year through and including the date of Executive's termination, and the denominator of which shall be three-hundred and sixty-five (365). The target bonus is the amount Executive would be entitled to receive if all of Executive's baseline goals for the applicable fiscal year are achieved. The pro-rated target bonus will be paid as soon as practicable following Executive's termination of employment but in no event later than the next pay period after Executive's termination of employment.

(iv) Continued Health Insurance Benefits. If Executive is eligible for, and elects continuation coverage pursuant to COBRA for Executive and Executive's eligible dependents (as applicable) under a health, dental, or vision plan sponsored by the Company, within the time period prescribed pursuant to COBRA, the Company will reimburse Executive, as and when due to the COBRA carrier, for the COBRA premiums for such coverage for Executive and his eligible dependents (at the coverage levels in effect immediately prior to Executive's termination of employment) until the earliest to occur of (A) a period of twelve (12) months from the last date of employment of Executive with the Company, (B) the date upon which Executive becomes eligible for coverage under a health, dental, or vision insurance plan of a subsequent employer, and (C) the date Executive or, in the case of a coverage for a dependent of Executive, the applicable dependent, ceases to be eligible for COBRA coverage. These payments will be subject to any applicable tax withholdings (including tax withholdings necessary to ensure that the provision of this benefit is not deemed a discriminatory practice giving rise to penalties to the Company under applicable laws) and will be counted as coverage pursuant to COBRA to the maximum extent permitted under applicable law.

(v) Equity. All of Executive's unvested and outstanding equity awards that would have become vested had Executive remained in the employ of the Company for the twelve (12)-month period following Executive's termination of employment shall immediately vest and become exercisable as of the date of Executive's termination. In addition, Executive will have six (6) months following any such termination of employment in which to exercise any stock options, stock appreciation rights, or similar rights to acquire Company common stock, but in no event will such equity award be permitted to be exercised beyond the earlier of the original maximum term of such equity award or ten (10) years from the original grant date of such equity award.

(vi) Outplacement Benefits. If requested by Executive, the Company will pay the expense for outplacement benefits provided by a service to be determined by the Company in its discretion for a period of six (6) months, up to a maximum dollar value of five thousand dollars ($5,000) following Executive's termination.

(vii) Payments or Benefits Required by Law. Executive will receive such other compensation or benefits from the Company as may be required by law.

(c) Disability; Death. If Executive's employment with the Company is terminated due to Executive becoming Disabled or Executive's death, then Executive or Executive's estate (as the case may be) will (i) receive the earned but unpaid base salary through the date of termination of employment, (ii) receive all accrued PTO, expense reimbursements and any other benefits due to Executive through the date of termination of employment in accordance with Company-provided or paid plans, policies and arrangements, and (iii) not be entitled to any other compensation or benefits from the Company except to the extent required by law (for example, COBRA). All payments under clauses (i) through (ii) above shall be made in accordance with the law of the State of California.

(d) Voluntary Resignation; Termination for Cause. If Executive voluntarily terminates Executive's employment with the Company (other than for Good Reason at any time during employment and including the twenty-four (24)-month period immediately following a Change of Control) or if the Company terminates Executive's employment with the Company for Cause, then Executive will (i) receive his or her earned but unpaid base salary through the date of termination of employment, (ii) receive all accrued vacation time, expense reimbursements and any other benefits due to Executive through the date of termination of employment in accordance with established Company-provided or paid plans, policies and arrangements, and (iii) not be entitled to any other compensation or benefits from the Company except to the extent required by law (for example, COBRA).

(e) Timing of Payments. Except as required by law, subject to any specific timing provisions in Section 3(a), 3(b) or 3(c) as applicable, or the provisions of Section 4, payment of the severance and benefits hereunder shall be made or commence to be made as soon as practicable following Executive's termination of employment but in no event later than the next pay period after Executive's termination of employment.

4. Conditions to Receipt of Severance.

(a) Release of Claims Agreement. The receipt of any severance payments or benefits pursuant to this Agreement is subject to Executive signing and not revoking a separation agreement and release of claims in a form mutually acceptable to the Company and Executive (the "***Release***"), which must become effective no later than the sixtieth (60th) day following Executive's termination of employment (the "***Release Deadline***"), and if not, Executive will forfeit any right to severance payments or benefits under this Agreement. To become effective, the Release must be executed by Executive and any revocation periods (as required by statute, regulation, or otherwise) must have expired without Executive having revoked the Release. In addition, in no event will severance payments or benefits be paid or provided until the Release actually becomes effective. If the termination of employment occurs at a time during the calendar year where the Release Deadline could occur in the calendar year following the calendar year in which Executive's termination of employment occurs, then any severance payments or benefits under this Agreement that would be considered Deferred Payments (as defined in Section 4(c)(i)) will be paid on the first payroll date to occur during the calendar year following the calendar year in which such termination occurs, or such later time as required by (i) the payment schedule applicable to each payment or benefit as set forth in Section 3, (ii) the date the Release becomes effective, or (iii) Section 4(c)(ii); provided that the first payment shall include all amounts that would have been paid to Executive if payment had commenced on the date of Executive's termination of employment.

(b) Confidential Information and Invention Assignment Agreements. Executive's receipt of any payments or benefits under this Agreement will be subject to Executive continuing to comply with the terms of any confidential information and invention assignment agreement executed by Executive in favor of the Company and the provisions of this Agreement.

(c) Application of Section 409A.

(i) Notwithstanding anything to the contrary in this Agreement, no severance pay or benefits to be paid or provided to Executive, if any, pursuant to this Agreement that, when considered together with any other severance payments or separation benefits, are considered deferred compensation not exempt under Section 409A (together, the "***Deferred Payments***") will be paid or otherwise provided until Executive has a "separation from service" within the meaning of Section 409A. And for purposes of this Agreement, any reference to "termination of employment," "termination" or any similar term shall be construed to mean a "separation from service" within the meaning of Section 409A. Similarly, no severance payable to Executive, if any, pursuant to this Agreement that otherwise would be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(9) will be payable until Executive has a "separation from service" within the meaning of Section 409A.

(ii) Notwithstanding anything to the contrary in this Agreement, if Executive is a "specified employee" within the meaning of Section 409A at the time of Executive's termination of employment (other than due to death), then the Deferred Payments, if any, that are payable within the first six (6) months following Executive's separation from service, will become payable on the first payroll date that occurs on or after the date six (6) months and one (1) day following the date of Executive's separation from service. All subsequent Deferred Payments, if any, will be payable in accordance with the payment schedule applicable to each payment or benefit. Notwithstanding anything herein to the contrary, if Executive dies following Executive's separation from service, but prior to the six (6) month anniversary of the separation from service, then any payments delayed in accordance with this paragraph will be payable in a lump sum as soon as administratively practicable after the date of Executive's death and all other Deferred Payments will be payable in accordance with the payment schedule applicable to each payment or benefit. Each payment, installment and benefit payable under this Agreement is intended to constitute a separate payment for purposes of Section 1.409A-2(b)(2) of the Treasury Regulations.

(iii) Without limitation, any amount paid under this Agreement that satisfies the requirements of the "short-term deferral" rule set forth in Section 1.409A-1(b)(4) of the Treasury Regulations is not intended constitute to Deferred Payments for purposes of clause (i) above.

(iv) Without limitation, any amount paid under this Agreement that qualifies as a payment made as a result of an involuntary separation from service pursuant to Section 1.409A-1(b)(9)(iii) of the Treasury Regulations that does not exceed the Section 409A Limit is not intended to constitute Deferred Payments for purposes of clause (i) above. Any payment intended to qualify under this exemption must be made within the allowable time period specified in Section 1.409A-1(b)(9)(iii) of the Treasury Regulations.

(v) To the extent that reimbursements or in-kind benefits under this Agreement constitute non-exempt "nonqualified deferred compensation" for purposes of Section 409A, (1) all reimbursements hereunder shall be made on or prior to the last day of the calendar year following the calendar year in which the expense was incurred by Executive, (2) any right to reimbursement or in-kind benefits shall not be subject to liquidation or exchange for another benefit, and (3) the amount of expenses eligible for reimbursement or in-kind benefits provided in any calendar year shall not in any way affect the expenses eligible for reimbursement or in-kind benefits to be provided, in any other calendar year.

(vi) Any tax gross-up that Executive is entitled to receive under this Agreement or otherwise shall be paid to Executive no later than December 31 of the calendar year following the calendar year in which Executive remits the related taxes.

(vii) Notwithstanding any other provision of this Agreement to the contrary, in no event shall any payment under this Agreement that constitutes "nonqualified

deferred compensation" for purposes of Code Section 409A be subject to offset by any other amount unless otherwise permitted by Code Section 409A.

(viii) The payments and benefits provided under Sections 3(a) and 3(a) are intended to be exempt from or comply with the requirements of Section 409A so that none of the severance payments and benefits to be provided hereunder will be subject to the additional tax imposed under Section 409A, and any ambiguities or ambiguous terms herein will be interpreted to be exempt or so comply. The Company and Executive agree to work together in good faith to consider amendments to this Agreement and to take such reasonable actions which are necessary, appropriate or desirable to avoid imposition of any additional tax or income recognition prior to actual payment to Executive under Section 409A.

5. Limitation on Payments.

(a) Anything in this Agreement to the contrary notwithstanding, if any payment or benefit Executive would receive from the Company or otherwise ("***Payment***") would (i) constitute a "parachute payment" within the meaning of Section 280G of the Code; and (ii) but for this sentence, be subject to the excise tax imposed by Section 4999 of the Code (the "***Excise Tax***"), then such Payment shall be equal to the Reduced Amount. The "***Reduced Amount***" shall be either (x) the largest portion of the Payment that would result in no portion of the Payment being subject to the Excise Tax; or (y) the largest portion, up to and including the total, of the Payment, whichever amount, after taking into account all applicable federal, state and local employment taxes, income taxes, and the Excise Tax (all computed at the highest applicable marginal rate), results in Executive's receipt, on an after-tax basis, of the greater amount of the Payment. Any reduction made pursuant to this Section 5(a) shall be made in accordance with the following order of priority: (i) stock options whose exercise price exceeds the fair market value of the optioned stock ("***Underwater Options***") (ii) Full Credit Payments (as defined below) that are payable in cash, (iii) non-cash Full Credit Payments that are taxable, (iv) non-cash Full Credit Payments that are not taxable, (v) Partial Credit Payments (as defined below) and (vi) non-cash employee welfare benefits. In each case, reductions shall be made in reverse chronological order such that the payment or benefit owed on the latest date following the occurrence of the event triggering the excise tax will be the first payment or benefit to be reduced (with reductions made pro-rata in the event payments or benefits are owed at the same time). "***Full Credit Payment***" means a payment, distribution or benefit, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise, that if reduced in value by one dollar reduces the amount of the parachute payment (as defined in Section 280G of the Code) by one dollar, determined as if such payment, distribution or benefit had been paid or distributed on the date of the event triggering the excise tax. "***Partial Credit Payment***" means any payment, distribution or benefit that is not a Full Credit Payment. In no event shall Executive have any discretion with respect to the ordering of payment reductions.

(b) Unless the Company and Executive otherwise agree in writing, any determination required under this Section 5 will be made in writing by an independent firm (the "***Firm***"), whose determination will be conclusive and binding upon Executive and the Company for all purposes. For purposes of making the calculations required by this Section 5, the Firm may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and Executive will furnish to the Firm such information and documents as the Firm may reasonably request in order to make a determination under this Section 5. The Company will bear all costs the Firm may reasonably incur in connection with any calculations contemplated by this Section 5.

6. Definition of Terms. The following terms referred to in this Agreement will have the following meanings:

(a) Cause. "***Cause***" means (i) Executive's repeated willful failure to substantially perform his or her duties to the Company or deliberate and material violation of a material Company policy; (ii) Executive's commission of any act of fraud, embezzlement,

dishonesty or any other willful misconduct that has caused or is reasonably expected to result in material injury to the Company; (iii) unauthorized use or disclosure by Executive of any proprietary information or trade secrets of the Company or any other party to whom Executive owes an obligation of nondisclosure as a result of his or her relationship with the Company; or (iv) Executive's willful breach of any of Executive's material obligations under any written agreement or covenant with the Company, in each case in the reasonable determination of the Board. For purposes of this definition, "***Company***" shall be interpreted to include any parent, subsidiary, affiliate or successor thereto, if appropriate. Notwithstanding the foregoing, Cause shall not exist based on conduct described in clause (i) unless the conduct has not been cured within 30 days following Executive's receipt of written notice from the Company in each instance specifying the particulars of the conduct constituting Cause.

(b) Change in Control. "***Change in Control***" shall have the meaning provided in the Resonant Inc. Amended and Restated 2014 Omnibus Incentive Plan.

(c) Code. "***Code***" means the Internal Revenue Code of 1986, as amended.

(d) Disability. "***Disability***" or "***Disabled***" means that Executive is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or which has lasted, or can be expected to last, for a continuous period of not less than one (1) year.

(e) Good Reason. "***Good Reason***" means the occurrence of one or more of the following, without Executive's express written consent:

(i) a material reduction in Executive's job responsibilities as such responsibilities exist on the date that is three (3) months prior to the Change in Control;

(ii) a reduction in Executive's then-current base salary by at least 10%, provided that an across-the-board reduction in the salary level of all other employees or consultants in positions similar to Executive's by the same percentage amount as part of a general salary level reduction shall not constitute such a salary reduction;

provided, however, that in order for an event to qualify as Good Reason, Executive must (1) provide the Company with written notice of the acts or omissions constituting the grounds for Good Reason within 90 days of the initial existence of the grounds for Good Reason, (2) allow the Company at least 30 days from receipt of such written notice to cure such event, and (3) if such event is not reasonably cured within such period, Executive's resignation from all positions then held by Executive with the Company must be effective not later than 30 days after the expiration of the cure period.

(f) Section 409A. "***Section 409A***" means Code Section 409A, and the final regulations and any guidance promulgated thereunder or any state law equivalent.

(g) Section 409A Limit. "***Section 409A Limit***" will mean two (2) times the lesser of: (i) Executive's annualized compensation based upon the annual rate of pay paid to Executive during Executive's taxable year preceding Executive's taxable year of his or her separation from service as determined under Treasury Regulation Section 1.409A-1(b)(9)(iii)(A)(1) and any Internal Revenue Service guidance issued with respect thereto; or (ii) the maximum amount that may be taken into account under a qualified plan pursuant to Section 401(a)(17) of the Internal Revenue Code for the year in which Executive's separation from service occurred.

7. Successors.

(a) The Company's Successors. Any successor to the Company (whether direct or indirect and whether by purchase, merger, consolidation, liquidation or otherwise) to all

or substantially all of the Company's business and/or assets will assume the obligations under this Agreement and agree expressly to perform the obligations under this Agreement in the same manner and to the same extent as the Company would be required to perform such obligations in the absence of a succession. For all purposes under this Agreement, the term "***Company***" will include any successor to the Company's business and/or assets which executes and delivers the assumption agreement described in this Section 7(a) or which becomes bound by the terms of this Agreement by operation of law.

(b) Executive's Successors. The terms of this Agreement and all rights of Executive hereunder will inure to the benefit of, and be enforceable by, Executive's personal or legal representatives, executors, administrators, successors, heirs, distributees, devisees and legatees.

8. Notice.

(a) General. Notices and all other communications contemplated by this Agreement will be in writing and will be deemed to have been duly given when personally delivered or when mailed by U.S. registered or certified mail, return receipt requested and postage prepaid. In the case of Executive, mailed notices will be addressed to him or her at the home address which he or she most recently communicated to the Company in writing. In the case of the Company, mailed notices will be addressed to its corporate headquarters, and all notices will be directed to the attention of its General Counsel.

(b) Notice of Termination. Any termination by the Company for Cause or by Executive for Good Reason will be communicated by a notice of termination to the other party hereto given in accordance with Section 8(a) of this Agreement. Such notice will indicate the specific termination provision in this Agreement relied upon, will set forth in reasonable detail the facts and circumstances claimed to provide a basis for termination under the provision so indicated, and will specify the termination date (which will be not more than thirty (30) days after the giving of such notice), subject to any applicable cure period. The failure by Executive or the Company to include in the notice any fact or circumstance which contributes to a showing of Good Reason or Cause, as applicable, will not waive any right of Executive or the Company, as applicable, hereunder or preclude Executive or the Company, as applicable, from asserting such fact or circumstance in enforcing his or her or its rights hereunder, as applicable.

9. Miscellaneous Provisions.

(a) No Duty to Mitigate. Executive will not be required to mitigate the amount of any payment contemplated by this Agreement, nor will any such payment be reduced by any earnings that Executive may receive from any other source.

(b) Waiver. No provision of this Agreement will be modified, waived or discharged unless the modification, waiver or discharge is agreed to in writing and signed by Executive and by an authorized officer of the Company (other than Executive). No waiver by either party of any breach of, or of compliance with, any condition or provision of this Agreement by the other party will be considered a waiver of any other condition or provision or of the same condition or provision at another time.

(c) Headings. All captions and section headings used in this Agreement are for convenient reference only and do not form a part of this Agreement.

(d) Entire Agreement. This Agreement, the Employment Offer Letter (and any agreements referenced therein), the Mutual Agreement to Arbitrate Claims, the Employee Invention, Confidentiality and Non-Solicitation Agreement, and the equity plan agreements to be entered into in connection with my employment, together constitute the entire agreement of the parties hereto with respect to the subject matter hereof and thereof, and these agreements together supersede in their entirety all prior or contemporaneous representations, understandings, undertakings or agreements (whether oral or written and whether expressed or

implied) of the parties with respect to such matters. Executive acknowledges and agrees that this Agreement encompasses all the rights of Executive to any severance payments and/or benefits based on the termination of Executive's employment and Executive hereby agrees that he has no such rights except as stated herein. No waiver, alteration, or modification of any of the provisions of this Agreement will be binding unless in writing and signed by duly authorized representatives of the parties hereto and which specifically mention this Agreement. This Agreement does not supersede Executive's Employment Offer Letter, except with respect to the subject matter hereof, the Mutual Agreement to Arbitrate Claims or the Employee Invention, Confidentiality and Non-Solicitation Agreement to which Executive is a party.

(e) Choice of Law. The validity, interpretation, construction and performance of this Agreement will be governed by the laws of the State of California without giving effect to provisions governing the choice of law.

(f) Severability. The invalidity or unenforceability of any provision or provisions of this Agreement will not affect the validity or enforceability of any other provision hereof, which will remain in full force and effect.

(g) Withholding. All payments made pursuant to this Agreement will be subject to withholding of applicable income, employment and other taxes, as required by law.

(h) Counterparts. This Agreement may be executed in counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

[***Signature Page to Follow***]

IN WITNESS WHEREOF, each of the parties has executed this Agreement, in the case of the Company by its duly authorized officer, as of the day and year set forth below.

COMPANY:

RESONANT INC.

By:
Name:
Title:

EXECUTIVE:

By:
Name:

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in registration statements (Nos. 333-196344, 333-211893, 333-211894, 333-214571, 333-218542, 333-232094 and 333-239313) on Form S-8 and (Nos. 333-211375, 333-217255, 333-221089, 333-228353, 333-233570, 333-234370, 333-246336 and 333-254242) on Form S-3 of our report dated March 14, 2022, with respect to the consolidated financial statements of Resonant Inc.

/s/ KPMG LLP

Irvine, California
March 14, 2022

Exhibit 31.1

Certification of Principal Executive Officer Pursuant To
Exchange Act Rules 13a-14(a) and 15d-14(a),
As Adopted Pursuant To
Section 302 of Sarbanes-Oxley Act of 2002

I, George B. Holmes, certify that:

1. I have reviewed this Annual Report on Form 10-K of Resonant Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

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

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

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

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

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

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

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

Date: March 14, 2022

/s/ George B. Holmes
George B. Holmes
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

Certification of Principal Financial Officer Pursuant To
Exchange Act Rules 13a-14(a) and 15d-14(a),
As Adopted Pursuant To
Section 302 of Sarbanes-Oxley Act of 2002

I, Martin S. McDermut, certify that:

1. I have reviewed this Annual Report on Form 10-K of Resonant Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

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

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

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

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

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

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

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

Date: March 14, 2022

/s/ Martin S. McDermut
Martin S. McDermut
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

Certifications of Principal Executive Officer and Principal Financial Officer
Pursuant to 18 U.S.C. Section 1350, As Adopted Pursuant To
Section 906 of the Sarbanes-Oxley Act of 2002

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (18 U.S.C. 1350), George B. Holmes, Chief Executive Officer (Principal Executive Officer) and Martin S. McDermut, Chief Financial Officer (Principal Financial Officer) of Resonant Inc. (the "Company"), hereby certifies that, to the best of his knowledge:

1. Our Annual Report on Form 10-K for the year ended December 31, 2021, to which this Certification is attached as Exhibit 32.1 (the "Report"), fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

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

Date: March 14, 2022

/s/ George B. Holmes
George B. Holmes
Chief Executive Officer
(Principal Executive Officer)

/s/ Martin S. McDermut
Martin S. McDermut
Chief Financial Officer
(Principal Financial Officer)