VOCERA COMMUNICATIONS, INC.
Form 10-K
February 27, 2019
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington D.C. 20549

FORM 10-K

(Mark One)
x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018
OR
o 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: 001-35469

VOCERA COMMUNICATIONS, INC.
(Exact name of registrant as specified in its charter)

Delaware	94-3354663
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

Vocera Communications, Inc.
525 Race Street
San Jose, CA 95126
(408) 882-5100
(Address and telephone number of principal executive offices)

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

(Title of class)	(Name of exchange on which registered)
Common Stock, $0.0003 par value	New York Stock Exchange

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 x No o
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No x
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 x No o
Indicate by check mark whether the registrant has submitted electronically, every Interactive Data File required to be submitted pursuance 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 x No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K(§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company.

Large accelerated filer	x	Accelerated filer	o
Non-accelerated filer	o	Smaller reporting company	o
(Do not check if a smaller reporting company)			

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

As of June 30, 2018, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the registrant's common stock held by non-affiliates was approximately $746 million based upon the $29.89 closing price reported for such date on the New York Stock Exchange. For purposes of this disclosure, shares of common stock held by persons who hold more than 10% of the outstanding shares of common stock and shares held by executive officers and directors of the registrant have been excluded because such persons may be deemed to be affiliates of registrant. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of February 25, 2019, there were 30,804,783 shares of the registrant's common stock outstanding.

Documents Incorporated by Reference

Portions of the registrant's Proxy Statement for its 2019 Annual Meeting of Stockholders are incorporated by reference in Part III of this report. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2018.

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VOCERA COMMUNICATIONS, INC.
ANNUAL REPORT ON FORM 10-K
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PART I

This Annual Report on Form 10-K contains forward-looking statements that are based on our beliefs and assumptions regarding future events and circumstances, including statements regarding our strategies, our opportunities, developments in the healthcare market, acquisitions, our relationships with our customers and contract manufacturer and other matters. These statements are principally contained in Item 1, Business; Item 1A, Risk Factors; Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations; and other sections of this Annual Report on Form 10-K. Forward-looking statements include statements that are not historical facts and can be identified by words such as “project,” “believe,” “anticipate,” “plan,” “expect,” “estimate,” “intend,”, "seeks", “continue,” “sho “would,” “could,” “potentially,” “will” or “may,” or other similar words and phrases.

Forward-looking statements are subject to known and unknown risks, uncertainties and other factors that could cause actual results to differ materially from the results anticipated by these forward-looking statements. These risks, uncertainties and factors include those we discuss in this annual report in Item 1A, Risk Factors. You should read these risk factors and the other cautionary statements made in this Annual Report on Form 10-K as being applicable to all related forward-looking statements wherever they appear in this Annual Report on Form 10-K. It is not possible for us to predict all risks that could affect us, 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. Moreover, new risks emerge from time to time.

The forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

Item 1. Business

Overview

We are a provider of secure, integrated, intelligent communication and workflow solutions, focused on empowering mobile workers in healthcare, hospitality, energy, and other mission-critical mobile work environments in the United States and internationally. Today, the significant majority of our business is generated from sales of our solutions in the healthcare market to help our customers improve quality of care, patient experience, staff resiliency and operational efficiency. Care teams at nearly 1,600 healthcare facilities worldwide have selected our solutions to call and text securely, reduce alarm fatigue, and to enhance workflow and help improve patient experience. Our solutions can also be found in hotels, nuclear facilities, retail stores and other environments where mobile workers need to communicate and access resources instantly.

Our communication and collaboration solution, which includes an intelligent enterprise software platform; lightweight, wearable, voice-controlled communication devices; as well as smartphone applications, enables users to connect instantly with other staff simply by saying the name, function or group name of the desired recipient. It also delivers HIPAA-compliant secure text messages, alerts and alarms directly to smartphones and other mobile communication devices both inside and outside the hospital, replacing legacy pagers and in-building wireless phones. At the core of this solution is a patent-protected, enterprise-class server software platform. Our software platform is built on a scalable architecture and recognizes more than 100 spoken commands. Users can instantly communicate with others using the Vocera Smartbadge or Vocera Badge, or through client applications for iOS and Android devices. Our platform lets users communicate and collaborate with each other using voice or HIPAA-compliant secure texting, and unlike other solutions, allows users to reach people by their role, room assignment or department, without needing to know a person’s name or phone number. The system can also broadcast emergency messages to a single department or to an entire organization. Our solution can be integrated with other clinical systems, including Electronic Health Records (EHR), nurse call, patient monitoring and even some medical devices, to provide critical data, alerts, alarms and clinical context that enables better workflow. Our enterprise-class software platform also features an advanced clinical rules engine that unifies data from multiple sources simultaneously, enables prioritization of notifications, adds patient context, and sends messages to the right care team members on their mobile devices. Our platform allows clinicians to be away from the bedside while staying informed about their patients. Our

portfolio of over 140 unique integrations enhances clinical workflow by enabling the interoperability of our solution with a significant number of clinical and operational systems used in hospitals today.

Beyond healthcare, our solutions are used to quickly and contextually connect staff in other mission-critical mobile-worker environments. In the hospitality industry, it is used to enhance guest experience, as well as staff productivity and responsiveness. In the nuclear power industry, our solutions are used to instantly connect people and resources. In education, schools use our solutions to increase security and staff communication and libraries use it to enable their staff to be more mobile and attentive to patrons.

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Over our 19-year history, we have significantly enhanced and added features and functionality to these solutions through ongoing development based on frequent interactions with our customers. In January 2019, we introduced the Vocera Smartbadge which combines smartphone usability with the same wearable, hands-free features as the Vocera Badge. The new Vocera Smartbadge has a 2.4" touchscreen, which enables clinicians view and send secure text messages as well as receive alerts and notifications with patient context.

Vocera Care Experience is a hosted software suite that coordinates and streamlines provider-to-patient and provider-to-provider communication in order to improve quality of care, patient and staff experience, reduce care provider's risk and improve reimbursements. The solution provides personalized patient instructions and education; provides alerts and notifications to physicians and caregivers of patients' changing care plans or status; and tracks patient experience before, during and after hospitalization.

Our Experience Innovation Network, a thought leadership collaborative, is a membership-based program designed to spread the adoption of leading strategies to improve patient experience and staff resiliency.

As of December 31, 2018, our solutions were selected by nearly 1,600 healthcare facilities, including large hospital systems, small and medium-sized local hospitals, clinics, surgery centers and aged-care facilities. We sell our solutions to our healthcare customers primarily through our direct sales force in the United States, with resellers for certain U.S. Government business, and through both direct sales and select distribution channels in international markets.

We were incorporated in Delaware on February 16, 2000. Our corporate headquarters are located at 525 Race Street, San Jose, California 95126, and our main telephone number is (408) 882 5100. We maintain a website at www.vocera.com. The contents of our website are not incorporated into, or otherwise to be regarded as part of, this Annual Report on Form 10-K.

Vocera® is our primary registered trademark in the United States. Other trademarks appearing in this document are the property of their respective holders.

Industry overview

Vocera provides communication and workflow solutions for mobile workers in healthcare, hospitality, energy, education and other industries. Healthcare is our largest vertical market.

Hospital communication is still predominantly conducted through multiple disparate, non-integrated systems, including pagers, overhead paging, portable in-building wireless phones and individuals' personal mobile phones. These non-integrated communication methods are inefficient and often unreliable; not providing "closed loop" communication, workflow standardization, or the scale required by health systems. Further, they often contribute to noisy environments for patients and negatively impact healing, safety, quality of care and operational efficiency. Broadly, we believe the healthcare industry is placing greater emphasis on the need for better communication and workflow to meet increasing requirements for care quality, patient safety, efficiency and patient satisfaction. Healthcare providers also require greater coordination of care among clinicians as the industry shifts towards population health and paying for value instead of the traditional fee-for-service reimbursement model. This shift to value-based purchasing incorporates financial incentives for hospitals to improve the quality of care and patient satisfaction. A number of non-government organizations, such as The Joint Commission, are also requiring improvements in patient safety and quality of care. These forces are driving hospitals to invest in technology and process improvements to manage their operations more efficiently, improve quality of care, and increase patient satisfaction and staff resiliency. Our solutions help hospitals increase productivity and reduce costs by enhancing workflow and improving patient and staff satisfaction through secure, integrated and intelligent communication.

Our strategy

Our goal is to extend our leadership position as a provider of communication and workflow solutions in the healthcare market and add new customers in non-healthcare markets.

Key elements of our strategy include:

- Expand our business to new U.S. healthcare customers. We believe our solutions can provide significant value to health systems, hospitals and smaller healthcare facilities. We plan to continue to add new customers among hospitals

of all sizes, and expand to outpatient clinics and skilled nursing facilities.

- Further expand our footprint within our existing installed customer base. Many of our customers initially deploy our solutions in a few departments of a hospital and gradually expand to additional departments as they come to fully appreciate its value. We have a significant opportunity to up-sell and cross-sell to our existing customers, including into new hospitals that are part of an existing healthcare system customer. Key sales strategies include expanding our footprint at existing

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customer facilities and capturing additional revenue by cross selling additional solutions. We plan to continue expanding within our existing customers in order to grow our revenue and maintain and improve customer experience.

- Extend our technology advantage and create new product solutions. We intend to continue our investment in research and development to enhance the functionality of our solutions and further differentiate them from other competing solutions. As we did with the introduction of the Smartbadge in January 2019, we plan to continue to invest in product upgrades, product line extensions and new solutions to enhance our portfolio, including further development of applications for iOS and Android devices.

- Increase our health system selling efforts. Our increasingly comprehensive product suite is enabling us to sell to large health systems. These sales efforts typically involve conversations with more senior decision makers and result in larger deal sizes with complex and elongated sales cycles. We have organized a national accounts sales team to pursue more of these opportunities in the future.

- Invest in partnerships. In order to gain access to clinical data and patient context needed to create a highly efficient communication and workflow system for the entire care team, we plan to continue to broaden our ecosystem of technology partners, including vendors that provide nurse call systems, patient monitoring systems, analytics and EHRs. We added new partnerships in 2018 and will continue to explore new relationships that broaden our overall market presence and accelerate the sales of our offerings.

- Pursue acquisitions of complementary businesses, technologies and assets. Over the last seven years we have completed a number of acquisitions to help us achieve our strategic vision by enhancing our products and enabling us to enter new markets. Our acquisitions have expanded our solutions, demonstrating that we can successfully source, acquire and integrate complementary businesses, technologies and assets. We intend to continue to pursue acquisition opportunities that we believe can accelerate the growth of our business.

- Grow our international healthcare presence. Today, in addition to our core U.S. market, we sell into other English-speaking markets, including Canada, the United Kingdom, Australia, New Zealand, and Middle Eastern countries including the United Arab Emirates, Saudi Arabia, Oman and Qatar. We believe that the rapid pace of investment in new healthcare facilities in these developing international markets provides a significant opportunity for growth. As of December 31, 2018, our solutions were selected by approximately 280 healthcare facilities outside the United States. We plan to utilize both our direct sales force and leverage channel partners to expand our presence into other markets over time.

- Expand our solutions in non-healthcare markets. While our primary focus is on the healthcare market, our solutions also provide great value in non-healthcare markets. Our solutions have been selected by facilities in markets beyond healthcare including hospitality, energy and other mission critical mobile worker environments. Currently, this is not a material portion of our revenue, but longer term, we believe these markets could represent potential opportunities for growth.

Our products, technology and services

Our solutions include the Vocera Communication and Workflow System, Vocera Care Experience and our Experience Innovation Network, a thought leadership collaborative. To complement our solutions, we provide services, support and education to help our customers optimize the benefits of our solutions.

Vocera Communication and Workflow System

The Vocera Communication and Workflow System is comprised of a unique software platform that connects communication devices, including our hands-free, wearable, voice-controlled communication Smartbadge and Badge, and third-party mobile devices that use our software applications to become our enterprise-class software platform. The system transforms the way mobile workers communicate by enabling them to instantly connect via voice or secure text messaging. With a portfolio of over 140 third-party party clinical integrations, our system also enables the

intelligent delivery of alerts and alarms to a variety of mobile devices, providing real time situation awareness to care providers. Our hands-free voice capability allows mobile workers to connect with the right person simply by saying or selecting the name, function or group name of the person they want to reach, often while remaining at the point-of-care. Our system responds to over 100 spoken commands.

Some examples of common commands are shown below.

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Action	Spoken commands
Call by name	Call John Smith.
Call a group member	Call an Anesthesiologist.
Dial a phone number or extension	Dial extension 3145.
Initiate a broadcast to a group	Broadcast to Emergency Response Team.
Locate nearest member of a group	Where is the nearest member of Security?
Send a voice message	Record a message for Pediatric Nursing.

Components of the Vocera Communication and Workflow System include:

- Vocera Software Platform. At the heart of our Vocera Communication and Workflow System is a patent-protected, enterprise-class software platform. The intelligence of our client-server system is contained primarily within our server-software. This platform contains an optimized speech recognition engine, intelligent call routing and management functionality, reporting and analytics tools, clinical directories and user profiles. In addition, our platform has the ability to integrate with a significant number of third-party clinical systems, including telephony, nurse call, patient monitoring and EHR systems. Our software platform features an advanced clinical rules engine that unifies data from multiple sources simultaneously, enables prioritization of notifications, adds patient context, and sends messages to the right care team members on their mobile devices, helping to improve patient safety and satisfaction and increase operational efficiency. By providing real-time situational awareness about the patients and care teams, we enable healthcare workers to be more effective and suffer less from alarm and alert fatigue. Recognizing the rapidly expanding footprint of care, our scalable software platform can support multiple geographic sites and multiple facilities within a healthcare system to help clinicians stay connected to the current status of their patients.
- Vocera Smartbadge. Our Smartbadge, launched in January 2019, is the only wearable communication device purpose-built for patient care. Our Smartbadge is powered by the Vocera Software Platform and operates over customers' industry-standard Wi-Fi networks. The Smartbadge has a 2.4” touchscreen and keyboard that enables the user to receive prioritized alert and alarm notifications with additional patient context. Additionally users can make and answer calls hands-free or by holding it up to the ear for privacy, and send and receive secured text messages with no character limit. The Smartbadge also has a dedicated panic button and enhanced "do not disturb" functionality.
- Vocera Badge. Our Badge is a smaller and lighter weight hands-free wearable device that allows the users instant two-way voice conversations without the need to remember a phone number or use a handset. Similar to the Smartbadge, it is powered by the Vocera Software Platform and operates over the customers' industry-standard Wi-Fi networks. It has a small display that provides a concise amount of information and allows the user to receive prioritized alarm and alert notifications with limited context. The Badge has received the FIPS 140-2 certification from the National Institute of Standards and Technology. We have also received an Authority to Operate (ATO) certification from the U.S. Department of Defense. Both of these certifications are requirements to sell our solutions to U.S. government and military hospital and medical facilities.
- Vocera Smartphone Applications. Vocera's suite of smartphone applications enable a seamless multi-mode communications and collaboration experience; combining the unique calling, texting, alerting and content distribution capabilities of Vocera into a secure, easy-to-use smartphone application. Available and certified for use on commercially-available iOS and Android devices, our smartphone applications support both personal (BYOD) and shared device usage models. A specific version of our smartphone software includes our instant voice communication solution and our secure enterprise messaging and alerting solution that enable the robust, reliable and HIPAA-compliant delivery of critical pages, text, messages, alarms and alerts. Users can receive and send messages

from smartphones, through a web-based console, or through integrated third-party clinical systems.

- Choice of Mobile Devices. We resell the Zebra Technologies TC51 Android mobile computer. These devices are offered as a bundled solution with our smartphone applications to provide a complete, turnkey solution for our customers' clinical communication needs. We also deliver our solution on iOS devices. This gives our customers a choice of different devices to access the power of the Vocera software platform.

Vocera Care Experience

Our Care Experience solution is a hosted software suite we developed to improve patient and staff experience. Vocera Care Experience suite offers caregivers communication solutions that span the entire care continuum - before admission, during treatment and after discharge. This patient-centric solution is designed to enable hospitals and health systems to improve care quality and safety, enhance patient experience and satisfaction, simplify and automate manual tasks and procedures, improve patient satisfaction

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scores under the Hospital Consumer Assessment of Healthcare Providers and Systems Survey (HCAHPS), and otherwise increase revenue and decrease costs.

Vocera Care Experience includes the following modules:

- Pre-Arrival Patient Communication - Enables organizations to send timely information to patients prior to scheduled procedures, streamlining the arrival process, decreasing no-shows and last minute cancellations and improving patient engagement.
- Good to Go® - Live discharge instructions are recorded and securely made available for patients, families and other care providers to review at any time, using any device.
- Care Calls - Streamlines patient follow-up calls and workflows using best practice checklists, risk stratification information and recorded discharge instructions.
- Rounds - Measures and manages patient experience during a hospital stay in real-time to evaluate gaps in satisfaction and provide service recovery interventions.

Services

Our customer-centric strategy is supported by our services and support capabilities, which help customers optimize their use of Vocera solutions and enhance users' experience with our products. Our services organization consists of the following:

- Professional services. Our professional services help customers successfully deploy, manage, update and/or expand their Vocera systems in order to gain the full benefits of our solutions. As of December 31, 2018, our professional services team consisted of 118 professionals with expertise in wireless communication, clinical workflow, end-user training, speech science and project management. We offer a full suite of services, including clinical workflow design, wireless assessment, solution configuration, training and project management, enabling customers to integrate our solutions and improve workflow efficiency and staff productivity. We also provide classroom and distance learning curricula for systems administrators, information technology professionals and clinical educators.
- Software Maintenance and Technical support. We provide 24x7 technical support to our customers through our support centers in San Jose, California; Fort Wayne, Indiana; Toronto, Canada; Knoxville, Tennessee and Reading, United Kingdom. As of December 31, 2018, our technical support team consisted of 63 technical support professionals with expertise in wireless, telephony, integration, servers and client devices. Our team utilizes remote diagnostic tools to proactively assess the performance of customer systems. We assign technical account management resources to our largest accounts to help them expand the use of our solutions and facilitate adoption of new functionality. Software maintenance entitles customers to unspecified upgrades, bug fixes and patch releases. Additional services, including an annual Remote System Health Assessment and biweekly technical webinar education, are offered as project-based consulting or through our membership collaborative.
- Experience Innovation Network. The Experience Innovation Network is a membership program that partners with healthcare provider organizations to further the development of innovations and solutions that improve care team and patient experience as well as clinical and operational performance.
- Vocera University. We provide hands-on, interactive educational experience through classroom training, distance learning or customized courseware covering best practices, implementation and use of our solutions. Training courses are provided for systems administrators, IT professionals and industry-specific, end-user educators.

Sales and marketing

Sales

Our sales employees call on hospitals and healthcare systems in the United States, Canada, the United Kingdom, Australia, New Zealand and several countries in the Middle East. As of December 31, 2018, we had 152 sales and account support employees. The sales team is organized to allow us to better serve our customers and to support the different elements of our sales strategy. We supplement our sales organization by utilizing a U.S. government-authorized reseller to facilitate our sales to Veterans Administration and Department of Defense healthcare facilities. We also use resellers in certain international markets to supplement our sales efforts. Certain members of the sales team focus on the development of new customer relationships with large integrated health systems and government healthcare facilities. We enhance our sales efforts by including in our sales staff individuals

with nursing backgrounds to address clinical uses with, and provide utilization advice to, customers and potential customers. We have also staffed our sales team with system engineers who focus on the technical elements of system optimization, particularly wireless, and overall product configuration. We have a small direct sales team to focus on developing our non-healthcare business, including hospitality, energy and other mission-critical mobile work environments.

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Marketing

Our marketing efforts focus on building awareness and generating demand. We believe that continuing to increase our brand recognition is important for the growth of our business as well as generating demand for our solutions. As of December 31, 2018, we had 33 employees in marketing, product management and business development.

Our customer-centric marketing strategy is important to generating new sales leads as word of mouth promotion and testimonials are some of our most valuable marketing tools. A number of our customers have agreed to participate in video testimonials, white papers and case studies that validate the efficacy and the financial benefits of our solutions. We have been featured in numerous articles and on network television demonstrating increased patient satisfaction, streamlined hospital operations and enhanced employee satisfaction and safety. Additionally, we sponsor numerous customer-led webinars to demonstrate customer success and to let prospective customers hear from their peer group about the positive impact that our solutions have made on their hospitals. Many of our sales leads come from referrals of existing customers or users who have moved from a hospital already using Vocera to a new facility or health system. We also invest in digital outreach to better influence buyers early on in their decision-making.

We have an integrated product management organization that manages the full lifecycle of our products and services; from strategy through execution to end-of-life. Our product roadmaps are driven by current and prospective customers and continually validated using primary and secondary research. We collect customer feedback through surveys and focus groups, customer visits, a customer advisory board, user forums and participation in industry standards organizations. Integral to this team are product managers and user experience designers skilled in clinical and operating workflows, and business development resources that create and manage the ecosystems of clinical and technology system partners.

Customers

Our solutions have been selected by more than 1,850 facilities worldwide. Of these, nearly 1,600 are hospitals and other healthcare facilities, and approximately 280 are outside of the United States. Our healthcare customers include national and international health and hospital systems, large and medium-sized independent and academic hospitals, small hospitals and healthcare facilities, and U.S. governmental hospitals and care facilities. With our diverse customer base, we have very low customer revenue concentration.

During 2018, 2017 and 2016, non-U.S. markets represented approximately 10.2%, 10.2%, and 10.4% of our revenue, respectively. We are developing plans to offer our solutions in a wider range of international markets.

Competition

We do not believe any single competitor offers a similar intelligent communication system to the healthcare market that allows instant, hands-free communication through voice-activated, role-based and activity-based calling, secure texting, and clinical integrations and workflows, and that features an advanced clinical rules engine that unifies data from multiple sources simultaneously on a combination of dedicated, proprietary devices, as well as third-party smartphones and other devices.

At this time, the primary alternative to our system consists of a combination of traditional communication methods utilizing wired phones, wireless in-building phones, smartphones, pagers and overhead paging systems.

The most significant alternative with which we compete for sales in the hospital are in-building wireless telephones and smartphone applications. While we compete with the providers of these wireless phones in making sales to hospitals, they do not at this time purport to contain the system intelligence, integrated workflow and convenience of our communication and workflow solutions. The market for in-building wireless phones is dominated by large communications companies such as Cisco Systems, Ascom and Spectralink.

Additionally, we compete against Epic and Cerner, both of which have their own smartphone application for secure texting. We differentiate against these Electronic Health Record (EHR) vendors as we enable hands-free communication via our Smartbadge and Badge and clinical workflow with our large portfolio of over 140 system integrations.

We believe that the use of mobile smartphone apps for healthcare will continue to expand in our target market and may represent a source of competition but this trend also represents an opportunity to expand our communication solutions with our smartphone applications, which enable all members of the patient's care team to connect to our software platform and participate as users on our Communication system.

We believe that the primary competitive factors at work in our market include:

- comprehensiveness of the solution and the features provided and the ability to purchase the complete solution from a single vendor
- product performance and reliability
- the initial cost and ongoing cost of ownership
- customer service and support capabilities

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We may face increased competition in the future, including from large, multinational companies or private equity backed organizations with significant resources. Potential competitors may have existing relationships with purchasers of other products and services within the hospital, which may enhance their ability to gain a foothold in our market. In addition, the continuing expansion of our communication and workflow collaboration capabilities, may introduce us to a broader set of competitors. These competitors may include companies that provide clinical workflow solutions, enterprise software, cloud-based solutions and electronic health records.

Research and development

Our continued investment in research and development is critical to our business. We have assembled teams of engineers with expertise in various fields, including software, firmware, database design, applications, speech recognition, wireless communication and hardware design. We employ research and development personnel in San Jose, California; Fort Wayne, Indiana; Knoxville, Tennessee; Toronto, Canada and Bangalore, India. There were 179 full-time research and development employees as of December 31, 2018. We also utilized small teams of contractors in India and Ukraine to assist with quality assurance testing and automation, and targeted development efforts.

Intellectual property

Our success depends, in part, upon our ability to protect our core technology and intellectual property. To accomplish this, we rely on a combination of intellectual property rights, including patents, trade secrets, copyrights and trademarks, as well as customary contractual protections.

We held 28 U.S. patents as of December 31, 2018, including patents on many capabilities of our software platform and wearable devices. The expiration dates of these patents range from 2021 through 2032. One or more utility patents have also been issued in Australia, Canada, India, Japan and the European Patent Office (with validation in Germany, United Kingdom and Netherlands). A European Community design patent has been issued that protects the design in multiple European jurisdictions.

In addition to the foregoing protections, we generally control access to and use of our proprietary software and other confidential information through the use of internal and external controls, including non-disclosure agreements and other statutory and contractual protections applicable to employees, contractors, customers and partners. These protections include U.S. and international copyright laws.

Our solutions include software developed and owned by us as well as software components we have licensed. These non-exclusive licenses are terminable by the licensor for cause. Certain of these licenses are for a contractually specified term and cannot be renewed without the assent of the licensor. In the event one or more of these licenses is terminated or is not renewed, we could be required to redesign substantial portions of our software in order to incorporate software components from alternative sources. An unplanned redesign of our software could materially and adversely affect our business.

Manufacturing operations and suppliers

We outsource the manufacturing of our wearable device products to original design manufacturers and contract manufacturers, including Sercomm and SMTC Corporation (SMTC). Our Vocera Smartbadge is built in Taiwan and our Vocera Badge is made in Mexico using custom tools and test equipment owned by us. Most of our accessories, including batteries, chargers and attachments, are built by original design manufacturers (ODMs) in Asia.

These manufacturers are responsible for procuring all the components included in our products, as specified and approved by us. Some of these components are sole-sourced off-the-shelf and some are custom components built exclusively for our products. In the event we are unable to procure certain components, we could be required to redesign some of our products in order to incorporate technology from alternative sources. An unplanned redesign of our products could materially and adversely affect our business.

We require our suppliers to perform both incoming and outgoing product inspections. In addition, we perform in-house quality control and ongoing reliability testing.

We also resell the Zebra Technologies TC51 Android mobile computer. These devices are offered as a bundled solution with our smartphone applications to provide a complete, turnkey solution for our customers' clinical communication needs.

Employees

As of December 31, 2018, we had 630 employees, consisting of 20 in manufacturing and quality operations, 179 in research and development, 185 in sales and marketing, 181 in services and support and 65 in general and administrative. None of our employees are covered by a collective bargaining agreement or are represented by a labor union. We consider current employee relations to be good.

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Backlog

Our backlog of undelivered orders was $61.8 million and $64.4 million at December 31, 2018 and 2017, respectively. Of the current backlog, all but $28.9 million is expected to be delivered in 2019.

Government regulations and standards

Substantially all of our revenue is derived from the healthcare industry. The healthcare industry is highly regulated and is subject to changing political, legislative, regulatory and other influences. These factors affect the purchasing practices and operations of healthcare organizations, as well as the behavior and attitudes of our users. Representatives of the U.S. federal legislature and agencies have announced plans to reform or revise aspects of the U.S. healthcare system and we expect these efforts to continue over the next several years. We also expect federal and state legislatures and agencies to continue to consider new programs to reform or revise aspects of the U.S. healthcare system. These programs may contain proposals to increase governmental involvement in healthcare or otherwise change the environment in which healthcare industry participants operate.

HIPAA privacy and security standards

In connection with our healthcare communications business, we access personal health information on behalf of our customers. Accordingly, in the United States, we are subject to the Health Insurance Portability and Accountability Act of 1996 (HIPAA), and its implementing regulations, which established uniform standards for certain “covered entities” (healthcare providers engaged in electronic transactions, health plans and healthcare clearinghouses) governing the conduct of certain electronic healthcare transactions and protecting the security and privacy of protected health information. The American Recovery and Reinvestment Act of 2009 included sweeping expansion of HIPAA’s privacy and security standards as reflected in the Health Information Technology for Economic and Clinical Health Act, (HITECH). Among other things, the new law makes certain HIPAA privacy and security standards directly applicable to “business associates” - independent contractors or agents of covered entities that receive or obtain protected health information in connection with providing a service on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney’s fees and costs associated with pursuing federal civil actions. Most of our customers are covered entities under HIPAA and, to the extent that we access personal health information on their behalf, we are their “business associates” and are subject to HIPAA and associated contractual obligations, as well as comparable state privacy and security laws.

In addition, we are subject to privacy and security regulations in other jurisdictions. For example, the European Union (EU) adopted the Data Protection Directive (DPD) (officially Directive 95/46/EC), imposing strict regulations and establishing a series of requirements regarding the storage of personally identifiable information on computers or recorded on other electronic media. This has been implemented by all EU member states through national laws. DPD provides for specific regulations requiring all non-EU countries doing business with EU member states to provide adequate data privacy protection when receiving personal data from any of the EU member states. In May 2016, the EU formally adopted the General Data Protection Regulation, which applied to all EU member states beginning May 2018 and replaces the current DPD. The regulation introduced new data protection requirements in the EU and substantial fines for breaches of the data protection rules. It increased our responsibility and liability in relation to personal data that we process and we put in place additional mechanisms ensuring compliance with the new EU data protection rules. Additionally, Canada’s Personal Information and Protection of Electronic Documents Act provides Canadian residents with privacy protections in regard to transactions with businesses and organizations in the private sector and sets out ground rules for how private sector organizations may collect, use and disclose personal information in the course of commercial activities.

These statutes, regulations and contractual obligations impose numerous requirements regarding the use and disclosure of personal health information with which we must comply, and subject us to material liability and other adverse impacts to our business in the event we fail to do so. These include, without limitation, civil fines, criminal sanctions in certain circumstances, contractual liability to our customers, and damage to our brand and reputation. We endeavor to mitigate these risks through measures we believe to be appropriate for the specific circumstances, including storing personal data under our control on password-protected systems in secure facilities, counseling our

customers as to best practices in using our solutions, and encrypting such information.

Medical device regulation

The U.S. Food and Drug Administration (FDA) regulates certain products, including software-based products, as "medical devices" based, in part, on the intended use of the product and the risk the device poses to the patient should the device fail to perform properly. We have concluded that our communication products are general-purpose communication solutions and are not subject to FDA regulation. However, either the FDA could disagree with our conclusion or changes in our product or the FDA's evolving regulations could lead to the imposition of medical device regulation on more of our products. In this event, we would be subject to additional regulatory requirements, including the expense of compliance with Medical Device Reporting and Quality System regulation and the potential of liability for failure to comply, and we could be required to obtain 510(k) clearance

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or premarket approval of those products from the FDA prior to commercial distribution. Some of the products acquired as a result of the Extension Healthcare and mVisum acquisitions are regulated by the FDA as Class II medical devices under applicable law and FDA regulations. This includes potentially being subject to the 2.3% excise tax that was initially legislated under the Affordable Care Act, but which has been delayed through 2019 by a moratorium on the tax included in recent Congressional budget legislation passed in January of 2018. Class II devices are devices classified by the FDA as posing a moderate to high risk and therefore subject to both "general controls" and "special controls," as such terms are defined in the Food, Drug and Cosmetics Act. Further, our other products could become subject to the 2.3% excise tax when it becomes effective, if the FDA were to determine in the future that they constitute medical devices.

Electrical standards and FCC regulations

Our products emit radio frequency energy in the 2.4 and 5.0 GHz spectrum bands for which licensing by U.S. and other regulatory authorities is not required, provided that the products conform to certain requirements, e.g., maximum power output and tolerance of interference from other devices sharing that spectrum band. We subject our products to testing by independent testing laboratories for compliance with the relevant standards issued by various U.S. and international bodies, including the EU (with respect to the "CE" mark), the International Electrotechnical Commission, the Australian Communications and Media Authority, Underwriters Laboratories and CSA International.

Executive officers

The names of our executive officers, their ages as of February 27, 2019, and their positions are shown below.

Name	Age	Position
Brent D. Lang	51	Chairman and Chief Executive Officer
Justin R. Spencer	47	Executive Vice President and Chief Financial Officer
Douglas A. Carlen	49	Vice President Legal and General Counsel
M. Bridget Duffy, M.D.	59	Chief Medical Officer
Paul T. Johnson	55	Executive Vice President of Sales and Services

The Board chooses executive officers, who then serve at the Board's discretion. There is no family relationship between any of our directors or executive officers.

Brent D. Lang assumed the role of President and Chief Executive Officer and a board member effective June 1, 2013. He assumed the role of Chairman of the board effective June 2018. Mr. Lang served as our President and Chief Operating Officer from October 2007 through May 2013. From February 2007 to October 2007, he served as our Executive Vice President, from January 2007 to June 2007, he served as our Acting Chief Executive Officer, and from June 2001 through January 2007, he served as our Vice President of Marketing and Business Development. From September 1995 to June 2001, Mr. Lang served as senior director of marketing for 3Com Corporation, a networking company, where he was responsible for 3Com's digital home products. From June 1991 to June 1993, Mr. Lang worked as a strategy consultant for Monitor Company, Inc., a consulting firm, advising Fortune 500 companies. Mr. Lang earned a B.S. degree in Industrial and Operations Engineering from the University of Michigan and an M.B.A. degree from the Stanford University Graduate School of Business.

Justin R. Spencer has served as our Executive Vice President and Chief Financial Officer since August 2014. From September 2008 to November 2013, he served as Executive Vice President and Chief Financial Officer for Symmetricom, Inc., a provider of precise timekeeping and synchronization solutions, which was acquired by Microsemi Corporation in November 2013. From June 2007 to April 2008, Mr. Spencer served as the Executive Vice President and Chief Financial Officer at Covad Communications Group Inc., a provider of broadband integrated voice and data communications. From November 2002 until May 2007, Mr. Spencer served in various positions at Covad Communications Group Inc., including Interim Chief Financial Officer, Vice President of Finance and Director of

Corporate Development. Mr. Spencer currently serves on the Board of Directors of iPass Inc., including as Audit Committee Chair. Mr. Spencer holds a bachelor's degree in accounting from the University of Utah and a master's degree from The Wharton School.

Douglas A. Carlen has served as our General Counsel since July 2016. From August 2012 to June 2016, Mr. Carlen was the Vice President of Legal Affairs at Liquid Robotics, an ocean data services provider and developer of the Wave Glider. Prior to Liquid Robotics, Mr. Carlen served from August 2010 to August 2012 as Senior Vice President and General Counsel at MegaPath, a provider of data, voice and cloud-based communications services. From September 1999 to August 2010, he worked at Covad Communications in three corporate counsel roles, with the last three years as Senior Vice President and General Counsel. Mr. Carlen also specialized in corporate law and litigation at various firms from 1994 to 1999. Since 2011, Mr. Carlen has been on

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the board of directors for the Lupus Foundation of Northern California. He earned his bachelor's degree from the University of Southern California and a law degree from Hastings College of the Law.

M. Bridget Duffy, M.D. has served as our Chief Medical Officer since January 2013. Previously, Dr. Duffy was the co-founder of ExperiaHealth, Inc., which became a subsidiary of Vocera in November 2010. Dr. Duffy served as its Chief Experience Officer from July 2009 through October 2010, and as its Chief Executive Officer from November 2010 through July 2013. From July 2007 to June 2009, Dr. Duffy served as Chief Experience Officer of the Cleveland Clinic, a non-profit academic medical center. Dr. Duffy earned her Doctor of Medicine in June 1991 from the University of Minnesota and currently holds a Physician and Surgeon license in both the states of Minnesota and California.

Paul T. Johnson has served as our Executive Vice President of Sales and Services since October 2013. From August 2013 to October 2013, Mr. Johnson served as Vice President of Sales at Digital Insight, a provider of online and mobile banking solutions. Mr. Johnson served as Vice President of Sales and Relationship Management at Intuit's Financial Services Division (which was renamed Digital Insight following Intuit's sale of this business in August 2013) from January 2011 to August 2013. From November 2007 to December 2010, he served as the Executive Vice President, North America, Sage Business Solutions for Sage Software, Inc., a provider of business management software and services. In addition, Mr. Johnson previously served in various sales and services functions at International Business Machines Corporation. Mr. Johnson earned his M.B.A and B.S degrees in Business Administration from the University of Southern California.

Available information

We make available our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (Exchange Act), as amended, free of charge on our website at www.vocera.com, as soon as reasonably practicable after they are electronically filed with or furnished to the Securities and Exchange Commission (SEC).

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 set forth in this Annual Report on Form 10-K. Our business, financial condition, results of operations or future prospects could be materially and adversely harmed if any of the following risks, or other risks or uncertainties that are not yet identified or that we currently believe are immaterial, actually occur. The trading price of our common stock could decline due to any of these risks or uncertainties, and, as a result, you may lose all or part of your investment.

Risks related to our business and industry

We have incurred significant losses in the past, and will likely experience losses in the future.

We have incurred significant losses in the past and reported a net loss of $9.7 million for the year ended December 31, 2018. As of December 31, 2018, we had an accumulated deficit of $132.3 million. If we cannot make consistent progress toward future profitability, our business and our stock price may be adversely affected.

Our ability to be profitable in the future depends upon continued demand for our solutions from existing and new customers. Further market adoption of our solutions, including increased penetration within our existing customers, depends upon our ability to improve quality of care and patient and staff satisfaction and increase hospital efficiency and productivity, and bring value to customers outside of healthcare. In addition, our profitability will be affected by, among other things, our ability to execute on our business strategy, the timing and size of orders, the pricing and costs of our solutions, macroeconomic conditions affecting the health care industry and the extent to which we invest in sales and marketing, research and development and general and administrative resources.

We depend on sales in the healthcare market for substantially all of our revenue, and a decrease in sales in the healthcare market would harm our business.

To date, substantially all of our revenue has been derived from sales to the healthcare market and, in particular, hospitals. Sales to the healthcare market accounted for 97%, 97% and 97% of our revenue for the years ended December 31, 2018, 2017 and 2016, respectively. We anticipate that sales to the healthcare market will represent a significant portion of our revenue for the foreseeable future.

Most of our solutions require a substantial upfront investment by new customers. The cost of the initial deployment depends on the number of users and departments involved, the size and age of the hospital and the condition of the existing wireless

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infrastructure, if any, within the hospital. Even if hospital personnel determine that our solutions provide compelling benefits over their existing communications methods, their hospitals may not have, or may not be willing to spend, the resources necessary to install and maintain wireless infrastructure to initially deploy and support our solutions or expand our solutions to other departments or users. Hospitals face significant budget constraints from unpredictable patient population trends and commercial reimbursements, and increasing demands from, and competition for, patients. In addition, both governmental and commercial hospitals are experiencing lower Medicare reimbursement rates and higher compliance demands, and as part of the tax reform law that came into effect in December 2017, the tax penalty for violating the individual health insurance mandate under the Patient Protection and Affordable Care Act of 2010 (ACA) was set to zero effective in 2019, essentially repealing it. The President of the United States and members of Congress have also attempted to repeal or amend the ACA, as well as continue to undertake other healthcare reforms. As a consequence of these regulatory and other factors, we may experience slowdowns and deferral of orders for our solutions, or customers may choose other less expensive solutions, both of which could negatively impact our sales. We might not be able to sustain or increase our revenue from sales of our solutions, or achieve the growth rates that we envision, if hospitals continue to face significant budgetary constraints and reduce their spending on communications systems.

While we are seeking to increase sales of our solutions to non-healthcare customers, we do not anticipate non-healthcare markets to represent a significant portion of our revenue for the foreseeable future.

If we fail to successfully develop and introduce new solutions and features to existing solutions, our revenue, operating results and reputation could suffer.

Our success depends, in part, upon our ability to develop and introduce new solutions and features to existing solutions that meet existing and new customer requirements. We may not be able to develop and introduce new solutions or features on a timely basis or in response to customers' changing requirements, or that sufficiently differentiate us from competing solutions such that customers can justify deploying our solutions. We expect to incur costs associated with the development and introduction of new solutions before the anticipated benefits or the returns are realized, if at all. We may experience technical problems and additional costs as we introduce new features to our software platform, deploy future models of our wireless badges (like the new Smartbadge), which can require customers to perform software upgrades to their systems, and integrate new solutions with existing customer clinical systems and workflows. In addition, we may face technical difficulties as we expand into non-English speaking countries and incorporate non-English speech recognition capabilities into our solutions. We also may incur substantial costs or delays in the manufacture of any additional new products or models as we seek to optimize production methods and processes at our contract manufacturer. In addition, we expect that we will at least initially achieve lower gross margins on new models, while endeavoring to reduce manufacturing costs over time. If any of these problems were to arise, our revenue, operating results and reputation could suffer.

If we fail to offer high-quality services and support for any of our solutions, our operating results and our ability to sell those solutions in the future will be harmed.

Our ability to sell our solutions is dependent upon our professional services and technical support teams providing high-quality services and support. Our professional services team assists our customers with their wireless infrastructure assessment, clinical workflow design, communication solution configuration, clinical integration, training and project management during the pre-deployment and deployment stages. Once our solutions are deployed within a customer's facility, the customer typically depends on our technical support team to help resolve technical issues, assist in optimizing the use of our solutions and facilitate adoption of new functionality. If we do not effectively assist our customers in deploying our solutions, succeed in helping our customers quickly resolve technical and other post-deployment issues, or provide effective ongoing support services, our ability to expand the use of our solutions with existing customers and to sell our solutions to new customers will be harmed. If deployment of our solutions is deemed unsatisfactory, we may incur significant costs to attain and sustain customer satisfaction or, in

extreme cases, our customers may choose not to deploy our solutions. As we rapidly hire new services and support personnel, we may inadvertently hire underperforming people who will have to be replaced, or fail to effectively train such employees, leading in some instances to slower growth, additional costs and poor customer relations. In addition, the failure of channel partners to provide high-quality services and support in markets outside the United States could also harm sales of our solutions.

As we continue to pursue opportunities for larger deals that have greater technical complexity, including deals that require more complex integrations with our customer's workflows, we may experience a longer time period for our solutions to deploy and as a result, our revenue recognition for these deals may be delayed. Additionally, as we enter agreements with new and existing customers for larger and more complex deals across multiple sites, we have been, and may continue to be, required to agree to customer acceptance clauses. Delays may occur in obtaining customer acceptance regardless of the quality of our products and services, and may cause us to defer revenue recognition where such acceptance provisions are substantive in nature, or they may require us to incur additional professional services or other costs in an effort to obtain such customer acceptance.

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Our sales cycle can be lengthy and unpredictable, which may cause our revenue and operating results to fluctuate significantly.

Our sales cycles can be lengthy and unpredictable. Our sales efforts involve educating our customers about the use and benefits of our solutions, including the technical capabilities of our solutions and the potential cost savings and productivity gains achievable by deploying them. Customers typically undertake a significant evaluation process, which frequently involves not only our solutions but also their existing communications methods and those of our competitors, and can result in a lengthy sales cycle, that sometimes exceeds twelve months. With our introduction of the Smartbadge, it may take our customers additional time to evaluate this new device and to compare it with our existing Badge and other solutions. This may also result in delays and reductions in orders for our existing Badge. We spend substantial time, effort and money in our sales efforts without any assurance that our efforts will produce sales. Similarly, our increasing dependence on larger, hospital-wide deployments may increase fluctuations in our revenue and operating results because the failure to complete a significant sale, or the loss of a large customer, will have a greater impact on those results. In addition, purchases of our solutions are frequently subject to budget constraints, multiple approvals, and unplanned administrative, processing and other delays. We have experienced and may continue to experience elongated sales cycles due to ongoing uncertainty surrounding past and future healthcare reform legislation, the impact of shifting federal government budgets, changes to Medicare and Medicaid reimbursement and potential future statutes and rulemaking.

Our business has gone through cycles of expansion, relative stability and contraction, and if we are not able to manage such cycles effectively, our operating results may suffer.

We have experienced periods of expansion, relative stability and contraction in our revenues and operations in the past. Such fluctuations have placed, and may continue to place, strains on our management systems, infrastructure and other resources. Especially during growth periods, we hire additional direct sales, professional services and marketing personnel domestically and internationally, acquire complementary businesses, technologies or assets, and increase our investment in research and development. Our future operating results depend to a large extent on our ability to successfully implement such plans and manage such investments. To do so successfully we must, among other things:

- manage our expenses in line with our operating plans and current business environment;
- maintain and enhance our operational, financial and management controls, reporting systems and procedures;
- integrate acquired businesses, technologies or assets;
- manage operations in multiple locations and time zones; and
- develop and deliver new solutions and enhancements to existing solutions efficiently and reliably.

We expect to incur costs associated with the investments made to support our business strategy before the anticipated benefits or the returns are realized, if any. If we are unable to grow our business or manage our future growth effectively, we may not be able to take advantage of market opportunities or develop new solutions or enhancements to existing solutions. We may also fail to satisfy customer requirements, maintain quality, execute our business plan or respond to competitive pressures, which could result in lower revenue and a decline in the share price of our common stock.

Our revenue and operating results have fluctuated, and are likely to continue to fluctuate, making our quarterly results difficult to predict, which may cause us to miss analyst expectations and may cause the price of our common stock to decline.

Our operating results have been and may continue to be difficult to predict, even in the near term, and are likely to fluctuate as a result of a variety of factors, many of which are outside of our control.

Comparisons of our revenue and operating results on a period-to-period basis may not be meaningful. You should not rely on our past results as an indication of our future performance. Each of the following factors, among others, could cause our operating results to fluctuate from quarter to quarter:

- the financial health of our healthcare customers and budgetary constraints on their ability to upgrade their communications;
- the availability of government funding for healthcare facilities operated by the United States federal, state and local governments;
- market acceptance of our Smartbadge and its impact on orders for our existing Badge and related software;
- changes in the regulatory environment affecting our healthcare customers, including impediments to their ability to obtain reimbursement for their services;
- our ability to expand our sales and marketing operations;
- our ability to successfully integrate acquired businesses;
- the announcement of new significant contracts or relationships;
- the procurement and deployment cycles of our healthcare customers and the length of our sales cycles;
- changes in how healthcare operating and capital budgets are administered within the enterprise;

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- changes in customer deployment timelines;
- variations in the amount of orders booked in a prior quarter but not delivered until later quarters;
- our mix of solutions and the varying revenue recognition rules that apply;
- pricing, including discounts by us or our competitors;
- our ability to expand into non-healthcare markets;
- our ability to develop significant new reseller relationships and maintain existing reseller relationships;
- the financial health of our resellers;
- our ability to successfully deploy our solutions in a timely manner;
- our ability to sell and integrate third-party products and services, and our customer's satisfaction with those third-party products and services;
- our ability to forecast demand and manage lead times for the manufacture of our solutions;
- our ability to develop and introduce new solutions and features to existing solutions that achieve market acceptance;
- the announcement of a new product, which may cause sales cycles to lengthen;
- federal government shutdowns;
- fluctuations in foreign currencies in the international markets in which we operate; and
- future accounting pronouncements and changes in accounting policies.

If we do not achieve the anticipated strategic or financial benefits from our acquisitions or if we cannot successfully integrate them, our business and operating results could be harmed.

We have acquired, and in the future may acquire, complementary businesses, technologies or assets that we believe to be strategic. We may not achieve the anticipated strategic or financial benefits, or be successful in integrating any acquired businesses, technologies or assets. If we cannot effectively integrate the acquired business and products into our business, we may not achieve market acceptance for, or derive significant revenue from, these new solutions. Integrating newly acquired businesses, technologies and assets could strain our resources, could be expensive and time consuming, and might not be successful. Our recent acquisitions expose us, and we will be further exposed, if we acquire or invest in additional businesses, technologies or assets, to a number of risks, including that we may:

- experience technical issues as we integrate acquired businesses, technologies or assets into our existing solutions;
- encounter difficulties leveraging our existing sales and marketing organizations, and direct sales channels, to increase our revenue from acquired businesses, technologies or assets;
- find that the acquisition does not further our business strategy, we overpaid for the acquisition or the economic conditions underlying our acquisition decision have changed;
- have difficulty retaining key personnel of acquired businesses;
- suffer disruption to our ongoing business and diversion of our management's attention as a result of transition or integration issues and the challenges of managing geographically or culturally diverse enterprises;
- experience unforeseen and significant problems or liabilities associated with quality, technology and legal contingencies relating to the acquisition, such as intellectual property or employment matters; and
- incur substantial costs to integrate the acquired business.

If we were to proceed with one or more additional significant acquisitions in which the consideration included cash, we could be required to use a substantial portion of our available cash. To the extent we issue shares of capital stock or other rights to purchase capital stock, including options and warrants, the ownership of existing stockholders would be diluted. In addition, acquisitions may result in the incurrence of debt, contingent liabilities, large write-offs, or other unanticipated costs, events or circumstances, any of which could harm our operating results.
In addition, from time to time we may enter into negotiations for acquisitions that are not ultimately consummated. These negotiations could result in significant diversion of management time, as well as substantial out-of-pocket costs.

We could be required to record adjustments to our recorded asset balance for intangible assets, including goodwill, that could significantly impact our operating results.

Our balance sheet includes significant intangible assets, including goodwill and other acquired intangible assets. The determination of related estimated useful lives and whether these assets have been impaired involves significant judgment and is subject to factors and events over which we have no control. The introduction of new competitive products or services into our markets could impair the value of our intangible assets if they create market conditions that adversely affect the competitiveness of our products and services. Further, declines in our market capitalization may be an indicator that our intangible assets or goodwill carrying values exceed their fair values, which could lead to potential impairment charges that could impact our operating results.

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Developments in the healthcare industry and governing regulations have negatively affected and may continue to negatively affect our business.

Substantially all of our revenue is derived from customers in the healthcare industry, in particular, hospitals. The healthcare industry is highly regulated and is subject to changing political, legislative, regulatory and other influences. Developments generally affecting the healthcare industry, including new regulations or new interpretations of existing regulations, could adversely affect spending on information technology and capital equipment by reducing funding, changing healthcare pricing or delivery or creating impediments for obtaining healthcare reimbursements, which together with declining admission trends, could cause our sales to decline and negatively impact our business. For example, the margins of our hospital customers are modest, and potential decreases in reimbursement for healthcare costs may reduce the overall solvency of our customers or cause further deterioration in their financial or business condition.

Since 2009, three significant bills were signed into law that impact the U.S. healthcare system. Those bills include The Health Information Technology for Economic and Clinical Health Act, enacted under Title XIII of the American Recovery and Reinvestment Act of 2009 (HITECH Act), the ACA, and the Health Care and Education Reconciliation Act of 2010. Together, these acts have driven substantive changes over several years to the operating processes, reimbursements and rules governing the U.S. healthcare system. Further, the President of the United States and members of Congress have stated their intent to significantly revise, repeal or reduce funding under the ACA. Uncertainty surrounding the status of the ACA and its regulations may impact the spending of our healthcare customers, and we cannot predict the effect on our business of any new legislation and regulations that may be adopted if the ACA is significantly changed or repealed.

We believe that our healthcare customers are unsure of the impact of the elements of those acts, as well as the related efforts to amend or repeal the ACA will have on their business, and cannot predict the timing and requirements of the final rules issued by the U.S. Department of Health and Human Services (HHS) for these statutes, making managing their business operations more difficult. Further, as has been experienced since 2010, as rules and agency guidance pursuant to these statutes are implemented and revised by HHS, a number of aspects of the acts have been interpreted, modified or delayed. For example, sudden changes in the rules for individuals buying insurance through state or federal health insurance exchanges, and individual and employer mandates to have and offer insurance coverage, had challenged hospitals' abilities to forecast patient utilization and revenues, and to set operational plans and budget accordingly. We believe that it is likely that additional legislative changes by Congress and rulemaking by HHS will continue.

Federal budget activities also impact our customers. Our customers include healthcare facilities run by the Department of Defense and the U.S. Department of Veterans Affairs. During the years ended December 31, 2018 and 2017, we generated approximately 18% and 18%, respectively of our revenue from these customers. Our reseller to the Department of Defense and the U.S. Department of Veterans Affairs represented 26% and 27% of our accounts receivable as of December 31, 2018 and December 31, 2017, respectively. These customers have been and may continue to be impacted by budgetary and legislative actions.

On December 22, 2018, certain departments of the U.S. federal government ceased operating as a result of failure by the legislative and executive branches of the government to pass bills to keep them operating. Although the congress passed a temporary operating budget, there is a risk that the government could be shut down again. Any past or future shutdown may impact our US government customers' spending decisions, as well as those of our non-US government customers. Any reduction or delay in our customers', or potential customers' spending decisions may result in a delay, or reduction, to our revenue.

In addition, many state governments are changing or expanding their healthcare laws, adding additional complexity to understanding the potential impacts.

We are unable to predict the full impact of these new and changing rules on our hospital customers and others in the healthcare industry. Impacts of these rules have affected and could continue to affect materially our customers' ability to budget for or purchase our products. The healthcare industry has changed significantly in recent years and we expect that significant changes will continue to occur. We cannot provide assurance that the markets for our

solutions will continue to exist at current levels or that we will have adequate technical, financial and marketing resources to react to changes in those markets.

We primarily compete in the rapidly evolving and competitive healthcare market, and if we fail to effectively respond to competitive pressures, our business and operating results could be harmed.

We believe that the primary competition for our solutions has consisted of traditional methods using wired and wireless phones, pagers and overhead intercoms. While we believe that our system is superior to these legacy methods, our solutions require a significant infrastructure investment by a hospital and many hospitals' spending is severely constrained by other priorities.

Manufacturers and distributors of product categories such as cellular phones, smartphone applications, pagers, mobile radios and in-building wireless telephones also sell their products to hospitals as components of communication solutions. Of these product categories, in-building wireless telephones and pagers represent the most significant current competition for the sale of our solutions.

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The market for in-building wireless phones is dominated by communications companies such as Cisco Systems, Ascom and Spectralink. In addition, the growing proliferation of smartphones and related applications, including cloud-based applications, represents another category of competitive offerings. Although our customers value secure text-messaging using smartphones, we do not believe most of our potential customers would consider that feature alone an adequate substitute for a comprehensive multi-mode communication solution. Some customers may choose solutions that are not HIPAA-compliant, given their budget constraints. Furthermore, in clinical integrations and middleware we compete with companies including Connexall and Philips Healthcare.

While we do not currently have a directly comparable single competitor that provides a solution as richly-featured as Vocera's solution for the healthcare market, we could face such competition in the future. Potential competitors in the healthcare or communications markets include large, multinational companies with significantly more resources to dedicate to product development and sales and marketing. These companies, which may include electronic health record vendors or other large software companies, may have existing relationships within the hospital, which may enhance their ability to gain a foothold in our market. For example, some of the electronic health record vendors have started to offer secure text messaging as an additional service and have said they plan to expand these offerings to complete more directly with us. Customers may prefer to purchase a more highly integrated or bundled solution from a single provider or an existing supplier rather than a new supplier, regardless of performance or features. Accordingly, if we fail to effectively respond to competitive pressures, we could experience pricing pressure, reduced profit margins, higher sales and marketing expenses, lower revenue and the loss of market share, any of which would harm our business, operating results or financial condition.

If we fail to increase market awareness of our brand and solutions, and expand our sales and marketing operations, our business could be harmed.

We intend to continue to add personnel and resources in sales and marketing as we focus on expanding awareness of our brand and solutions and capitalize on sales opportunities with new and existing customers. Our efforts to improve sales of our solutions will result in an increase in our sales and marketing expense and general and administrative expense, and these efforts may not be successful. Some newly hired sales and marketing personnel may subsequently be determined to be unproductive and have to be replaced, resulting in operational and sales delays and incremental costs. If we are unable to significantly increase the awareness of our brand and solutions or effectively manage the costs associated with these efforts, our business, financial condition and operating results could be harmed.

Failure to protect our information technology infrastructure against cyber-based attacks, network security breaches, service interruptions, or data corruption could significantly disrupt our operations and adversely affect our business and operating results.

We rely on information technology and telephone networks and systems, including the Internet, to process and transmit sensitive electronic information and to manage or support a variety of business processes and activities, including sales, billing, customer service, procurement and supply chain. We use enterprise information technology systems to record, process, and summarize financial information and results of operations for internal reporting purposes and to comply with regulatory financial reporting, legal, and tax requirements. Our information technology systems, some of which are managed by third-parties, may be susceptible to damage, disruptions or shutdowns due to computer viruses, attacks by computer hackers, failures during the process of upgrading or replacing software, databases or components thereof, power outages, hardware failures, telecommunication failures, user errors or catastrophic events. Although we have developed systems and processes that are designed to protect confidential information and prevent data loss and other security breaches, including systems and processes designed to reduce the impact of a security breach at a third-party vendor, such measures cannot provide absolute security. If our systems are breached or suffer severe damage, disruption or shutdown and we are unable to effectively resolve the issues in a timely manner, our business and operating results may significantly suffer and we may be subject to litigation, government enforcement actions or potential liability. Security breaches could also cause us to incur significant

remediation costs, result in product development delays, disrupt key business operations, adversely impact customer relationships, damage our reputation and divert attention of management and key information technology resources.

We depend on a number of sole source and limited source suppliers, and if we are unable to source our components from them, our business and operating results could be harmed.

We depend on sole and limited source suppliers for several hardware components of our solutions, including our batteries and integrated circuits. We purchase inventory generally through individual purchase orders. Any of these suppliers could cease production of our components, cease to provide the necessary levels of support for our use of their components, experience capacity constraints, material shortages, work stoppages, financial difficulties, cost increases or other reductions or disruptions in output, cease operations or be acquired by, or enter into exclusive arrangements with, a competitor. These suppliers typically rely on purchase orders rather than long-term contracts with their suppliers, and as a result, even if available, the supplier may not be able

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to secure sufficient materials at reasonable prices or of acceptable quality to build our components in a timely manner. Any of these circumstances could cause interruptions or delays in the delivery of our solutions to our customers, and this may force us to seek components from alternative sources, which may not have the required specifications, or be available in time to meet demand or on commercially reasonable terms, if at all. Any of these circumstances may also force us to redesign our solutions if a component becomes unavailable in order to incorporate a component from an alternative source.

Our solutions incorporate multiple software components obtained from licensors on a non-exclusive basis, such as voice recognition software, software supporting the runtime execution of our software platform, and database and reporting software. Our license agreements can be terminated for cause. In many cases, these license agreements specify a limited term and are only renewable beyond that term with the consent of the licensor. If a licensor terminates a license agreement for cause, objects to its renewal or conditions renewal on modified terms and conditions, we may be unable to obtain licenses for equivalent software components on reasonable terms and conditions, including licensing fees, warranties or protection from infringement claims. Some licensors may discontinue licensing their software to us or support of the software version used in our solutions. In such circumstances, we may need to redesign our solutions at substantial cost to incorporate alternative software components or be subject to higher royalty costs. Any of these circumstances could adversely affect the cost and availability of our solutions.

Third-party licensors generally require us to incorporate specific license terms and conditions in our agreements with our customers. If we are alleged to have failed to incorporate these license terms and conditions, we may be subject to claims by these licensors, incur significant legal costs defending ourselves against such claims and, if such claims are successful, be subject to termination of licenses, monetary damages, or an injunction against the continued distribution of one or more of our solutions.

Because we depend on contract manufacturers and original design manufacturers, our operations could be harmed and we could lose sales if we encounter problems with these manufacturers.

We do not have internal manufacturing capabilities and rely upon two contract manufacturers, Sercomm and SMTC, to make our wearable devices, we have entered into manufacturing agreements with Sercomm and SMTC that are terminable by either party with advance notice and that may also be terminated for a material uncured breach. We expect to enter into additional contract manufacturing agreements as we expand our business. We also rely on ODMs to produce accessories, including batteries, chargers and attachments. Any of these suppliers could cease production of our components, cease to provide the necessary levels of support for our use of their components, experience capacity constraints, material shortages, work stoppages, financial difficulties, cost increases or other reductions or disruptions in output, cease operations or be acquired by, or enter into exclusive arrangements with, a competitor. If Sercomm, SMTC, or another contract manufacturer or an ODM is unable or unwilling to continue manufacturing components of our solutions in the volumes and timeframes that we require, fails to meet our quality specifications or significantly increases its prices, we may not be able to deliver our solutions to our customers with the quantities, quality and performance that they expect in a timely manner. As a result, we could lose sales and our operating results could be harmed.

Sercomm, SMTC, other contract manufacturers or ODMs may experience problems that could impact the quantity and quality of hardware components of our solution, including disruptions in their manufacturing operations due to equipment breakdowns, labor strikes or shortages, component or material shortages and cost increases. Sercomm, SMTC, other contract manufacturers and these ODMs generally rely on purchase orders rather than long-term contracts with their suppliers, and as a result, may not be able to secure sufficient components or other materials at reasonable prices or of acceptable quality to build components of our solutions in a timely manner. The majority of the hardware components of our solution are manufactured in Asia or Mexico, and adverse changes in political or economic circumstances in those locations could also disrupt our supply and quality of components of our solutions. In addition, U.S. government officials have recently changed and proposed additional changes in trade, fiscal or tax policies, and any such changes in the U.S. or in other countries from which we source components of our products

could adversely affect our business.

Companies occasionally encounter unexpected difficulties in ramping up production of new products, and we may experience such difficulties with future generations of our products. Sercomm, SMTC, other contract manufacturers and our ODMs also manufacture products for other companies. Generally, our orders represent a relatively small percentage of the overall orders received by Sercomm, SMTC, other contract manufacturers and these ODMs from their customers; therefore, fulfilling our orders may not be a priority in the event Sercomm, SMTC, other contract manufacturers or an ODM is constrained in its ability to fulfill all of its customer obligations. In addition, if Sercomm, SMTC, other contract manufacturers or an ODM is unable or unwilling to continue manufacturing components of our solutions, we may have to identify one or more alternative manufacturers. The process of identifying and qualifying a new contract manufacturer or ODM can be time consuming, and we may not be able to substitute suitable alternative manufacturers in a timely manner or at an acceptable cost. Additionally, transitioning to a new manufacturer may cause us to incur additional costs and delays if the new manufacturer has difficulty manufacturing components of our solutions to our specifications or quality standards.

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If we fail to forecast our manufacturing requirements accurately, or fail to properly manage our inventory with our contract manufacturer, we could incur additional costs and experience manufacturing delays, which can adversely affect our operating results.

We place orders with our contract manufacturers, including Sercomm and SMTC, and we and our contract manufacturers place orders with suppliers based on forecasts of customer demand. Because of our international low cost sourcing strategy, our lead times are long and cause substantially more risk to forecasting accuracy than would result were lead times shorter. Our forecasts are based on multiple assumptions, each of which may introduce errors into our estimates affecting our ability to meet our customers' demands for our solutions. We also may face additional forecasting challenges due to new product introductions, product transitions in the components of our solutions, or to our suppliers discontinuing production of materials and subcomponents required for our solutions. If demand for our solutions increases significantly, we may not be able to meet demand on a timely basis, and we may need to expend a significant amount of time working with our customers to allocate limited supply and maintain positive customer relations, or we may incur additional costs in order to source additional materials and subcomponents to produce components of our solutions or to expedite the manufacture and delivery of additional inventory. If we underestimate customer demand, our contract manufacturer may have inadequate materials and subcomponents on hand to produce components of our solutions, which could result in manufacturing interruptions, shipment delays, deferral or loss of revenue, and damage to our customer relationships. Conversely, if we overestimate customer demand, we and our contract manufacturers may purchase more inventory than required for actual customer orders, resulting in excess or obsolete inventory, thereby increasing our costs and harming our operating results.

If hospitals do not have and are not willing to install, upgrade and maintain the wireless infrastructure required to effectively operate our solutions, then they may experience technical problems or not purchase our solutions at all.

The effectiveness of our solutions depends upon the quality and compatibility of the communications environment that our healthcare customers maintain. Our solutions require voice-grade wireless (Wi-Fi) installed through large enterprise environments, which can vary from hospital to hospital and from department to department within a hospital. Many hospitals have not installed a voice-grade wireless infrastructure. If potential customers do not have a wireless network that can properly and fully interoperate with our solutions, then such a network must be installed, or an existing Wi-Fi network must be upgraded or modified, for example, by adding access points in stairwells, for our solutions to be fully functional. The additional costs of installing or upgrading a Wi-Fi network may dissuade potential customers from installing our solutions. Furthermore, if changes to a customer's physical or information technology environment cause integration issues or degrade the effectiveness of our solutions, or if the customer fails to upgrade or maintain its environment as may be required for software releases or updates or to ensure our solution's effectiveness, the customer may not be able to fully utilize our solutions or may experience technical problems, or these changes may impact the performance of other wireless equipment being used. If such circumstances arise, prospective customers may not purchase or existing customers may not expand their use of or deploy upgraded versions of our solutions, thereby harming our business and operating results.

If we fail to achieve and maintain certification for certain U.S. federal standards, our sales to U.S. government customers will suffer.

We believe that a significant opportunity exists to continue to sell our products to healthcare facilities in the Veterans Administration and Department of Defense (DoD). These customers require independent certification of compliance with specific requirements relating to encryption, security, interoperability and scalability, including Federal Information Processing Standard (FIPS) 140-2 and, as to DoD, certification by its Joint Interoperability and Test Command and under its Information Assurance Certification and Accreditation Process. We have received certification under certain of these standards for military-specific configurations of our solution incorporating our Badge, but we do not have these certifications for our new Smartbadge. We continue to carry out further compliance

activities and recertifications, as required. A failure on our part to achieve and maintain compliance and to respond to new threats and vulnerabilities, both as to current products and as to new product versions, could adversely impact our revenue.

Our efforts to sell our solutions in non-healthcare markets may not be successful.

In recent years, we have actively engaged in sales efforts to customers outside the healthcare markets, including hospitality, energy and other mobile work environments. We may not be successful in further penetrating the non-healthcare markets upon which we are initially focusing, or other new markets. To date, our solutions have been selected by over 270 customers in non-healthcare markets. Total revenue from non-healthcare customers accounted for 3%, 3% and 3% of our revenue for the years ended December 31, 2018, 2017 and 2016, respectively. If we cannot maintain these customers by providing solutions that meet their requirements, if we cannot successfully expand our solutions in non-healthcare markets, or if adoption of our solutions remains slow, we may not obtain significant revenue from these markets. We may experience challenges as we expand in non-healthcare markets, including pricing pressure on our solutions and technical issues as we adapt our solutions for the requirements of new markets. Our solutions

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also may not contain the functionality required by these non-healthcare markets or may be too expensive or may not sufficiently differentiate us from competing solutions such that customers can justify deploying our solutions.

We generally recognize revenue from maintenance and support contracts and subscription arrangements over the contract term, and changes in sales may not be immediately reflected in our operating results.

We generally recognize revenue from our customer maintenance and support contracts, extended warranty contracts and subscription arrangements ratably over the contract term, which is typically 12 months, in some cases subject to an early termination right. Revenue from our maintenance and support contracts accounted for 35%, 32% and 33% of our revenue for the years ended December 31, 2018, 2017 and 2016, respectively. A portion of the revenue we report in each quarter is derived from the recognition of deferred revenue relating to maintenance and support contracts entered into during previous quarters. Consequently, a decline in new or renewed maintenance and support, extended warranty contracts or subscription agreements by our customers in any one quarter may not be immediately reflected in our revenue for that quarter. Such a decline, however, will negatively affect our revenue in future quarters. Accordingly, the effect of significant downturns in sales and market acceptance of our services and potential changes in our rate of renewals may not be fully reflected in our operating results until future periods.

Our success depends upon our ability to attract, integrate and retain key personnel, and our failure to do so could harm our ability to grow our business.

Our success depends, in part, on the continuing services of our senior management and other key personnel, and our ability to continue to attract, integrate and retain highly skilled personnel, particularly in engineering, sales and marketing. Competition for highly skilled personnel is intense, particularly in the Silicon Valley where our headquarters are located. If we fail to attract, integrate and retain key personnel, our ability to grow our business could be harmed.

The members of our senior management and other key personnel are at-will employees, and may terminate their employment at any time without notice. If one or more members of our senior management terminate their employment, we may not be able to find qualified individuals to replace them on a timely basis or at all and our senior management may need to divert their attention from other aspects of our business. Former employees may also become employees of a competitor. We may also have to pay additional compensation to attract and retain key personnel. We also anticipate hiring additional engineering, marketing and sales, and services personnel to grow our business. Often, significant amounts of time and resources are required to train these personnel. We may incur significant costs to attract, integrate and retain them, and we may lose them to a competitor or another company before we realize the benefit of our investments in them.

Our international operations subject us, and may increasingly subject us in the future, to operational, financial, economic and political risks abroad.

Although we derive a relatively small portion of our revenue from customers outside the United States, we believe that non-U.S. customers could represent an increasing share of our revenue in the future. During the years ended December 31, 2018, 2017 and 2016, we generated 10.2%, 10.2% and 10.4% of our revenue, respectively, from customers outside of the United States, including Canada, the United Kingdom, Australia, New Zealand and Middle Eastern countries including the United Arab Emirates, Saudi Arabia and Qatar. In 2014, we opened a new innovation center in India and a sales office in Dubai, United Arab Emirates. Accordingly, we are subject to risks and challenges that we would not otherwise face if we conducted our business solely in the United States, including:

- challenges incorporating non-English speech recognition capabilities into our solutions as we expand into non-English speaking jurisdictions;
- difficulties integrating our solutions with wireless infrastructures with which we do not have experience;
- difficulties integrating local dialing plans and applicable PBX standards;

- challenges associated with delivering support, training and documentation in several languages;
- difficulties in staffing and managing personnel and resellers;
- the need to comply with a wide variety of foreign laws and regulations, including increasingly stringent data privacy regulations, requirements for export controls for encryption technology, employment laws, changes in tax laws and tax audits by government agencies;
- political and economic instability in, or foreign conflicts that involve or affect, the countries of our customers;
- adverse effects on us directly, or on our customers and suppliers, of changes in trade, fiscal or tax policies, including the imposition of tariffs;
- difficulties in collecting accounts receivable and longer accounts receivable payment cycles;
- exposure to competitors who are more familiar with local markets;
- risks associated with the Foreign Corrupt Practices Act and local anti-bribery law compliance;
- difficulties associated with resolving contract disputes in foreign countries with varied legal systems;

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- limited or unfavorable intellectual property protection in some countries; and
- currency exchange rate fluctuations, which could affect the price of our solutions relative to locally produced solutions.

Any of these factors could harm our existing international business, impair our ability to expand into international markets or harm our operating results.

Our solutions are highly complex and may contain software or hardware defects that could harm our reputation and operating results.

Our solutions incorporate complex technology, are deployed in a variety of complex hospital environments and must interoperate with many different types of devices and hospital systems. While we test the components of our solutions for defects and errors prior to release, we or our customers may not discover a defect or error until after we have deployed our solution, integrated it into the hospital environment and our customer has commenced general use of the solution. In addition, our solutions in some cases are integrated with hardware and software offered by "middleware" vendors in order to interoperate with nurse call systems, device alarms and other hospital systems. Our software may also be deployed on third party devices, including devices we resell, which creates additional complexity because we share control of the customer experience. If we cannot successfully integrate our solutions with these vendors as needed or if any hardware or software of these vendors, contains any defect or error, then our solutions may not perform as designed, or may exhibit a defect or error.

Any defects or errors in, or which are attributed to our solutions, or to products or services we resell, could result in:

- delayed market acceptance of our affected solutions;
- loss of revenue or delay in revenue recognition;
- loss of customers or inability to attract new customers;
- diversion of engineering or other resources for remedying the defect or error;
- damage to our brand and reputation;
- delay in delivery of information;
- increased service and warranty costs, including potential replacement costs for product recalls or returns; and
- legal actions by our customers and hospital patients, including product liability claims.

If any of these occur, our operating results and reputation could be harmed.

We face potential liability related to the privacy and security of personal information collected through our solutions.

In connection with our healthcare business, we handle and have access to personal health information subject in the United States to the Health Insurance Portability and Accountability Act of 1996 (HIPAA) or HITECH, regulations issued pursuant to these statutes, state privacy and security laws and regulations, and associated contractual obligations as a "business associate" of healthcare providers. These statutes, regulations and contractual obligations impose numerous requirements regarding the use and disclosure of personal health information with which we must comply. Our failure to accurately anticipate the application or interpretation of these statutes, regulations and contractual obligations as we develop our solutions, a failure by us to comply with their requirements (e.g., evolving encryption and security requirements) or an allegation that defects in our products have resulted in noncompliance by our customers could create material civil and/or criminal liability for us, resulting in adverse publicity and negatively affecting our business.

In addition, the use and disclosure of personal health information is subject to laws and regulations in other jurisdictions in which we do business or expect to do business in the future. Any developments stemming from enactment or modification of these laws and regulations, or the failure by us to comply with their requirements or to accurately anticipate the application or interpretation of these laws could create material liability to us, result in adverse publicity and negatively affect our business.

For example, the European Union previously adopted the Data Protection Directive (DPD), imposing strict regulations and establishing a series of requirements regarding the storage of personally identifiable information on computers or recorded on other electronic media. This has been implemented by all EU member states through national laws. DPD provides for specific regulations requiring all non-EU countries doing business with EU member states to provide adequate data privacy protection when receiving personal data from any of the EU member states. In May 2016, the EU formally adopted the General Data Protection Regulation (GDPR), which applied to all EU member states starting in May 2018 and replaced the current DPD. The GDPR regulation introduces new data protection requirements in the EU and substantial fines for breaches of the data protection rules. It increased our responsibility and liability in relation to personal data that we process and we were required to put in place additional mechanisms ensuring compliance with the new EU data protection rules. Additionally, Canada's Personal Information and Protection of Electronic Documents Act, as well as a variety of provincial statutes, provides Canadian residents with privacy protections in regard to transactions with businesses and organizations in the private sector and sets out ground rules for how private sector organizations may collect, use and disclose personal information in the course of commercial activities. A finding

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that we have failed to comply with applicable laws and regulations regarding the collection, use and disclosure of personal information could create liability for us, result in adverse publicity and negatively affect our business. Any legislation or regulation in the area of privacy and security of personal information could affect the way we operate our services and could harm our business. For example, the European Court of Justice invalidated the U.S.-EU Safe Harbor framework that had been in place since 2000, which allowed companies to meet certain EU legal requirements for the transfer of personal data from the European Economic Area to the United States. While other adequate legal mechanisms to lawfully transfer such data remain, the invalidation of the U.S.-EU Safe Harbor framework may result in different European data protection regulators applying differing standards for the transfer of personal data, which could result in increased regulation, cost of compliance and limitations on data transfer for us and our customers. The costs of compliance with, and the other burdens imposed by, these and other laws or regulatory actions may prevent us from selling our solutions or increase the costs associated with selling our solutions, and may affect our ability to invest in or jointly develop solutions in the United States and in foreign jurisdictions. Further, we cannot assure you that our privacy and security policies and practices will be found sufficient to protect us from liability or adverse publicity relating to the privacy and security of personal information.

The failure of our equipment lease customers to pay us under leasing agreements with them that we do not sell to third party lease finance companies could harm our revenue and operating results.

In 2012, we began offering our solutions to our customers through multi-year equipment lease agreements. In connection with each sale, we recognize product-related revenue at the net present value of the lease payment stream once our obligations related to such sale have been met. We sell the bulk of these leases, including the related accounts receivables, to third party lease finance companies on a non-recourse basis. We will have to retain unsold leases in-house, which will expose us to the creditworthiness of such lease customers over the lease term. For the leases that we retain in-house, our ability to collect payments from a customer or to recognize revenue for the sale could be impaired if the customer fails to meet its obligations to us such as in the case of its bankruptcy filing or deterioration in its financial position, or has other creditworthiness issues, any of which could harm our revenue and operating results.

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If our efforts to protect the security of information collected by our customers are unsuccessful, we could become subject to costly government enforcement actions and private litigation, and our sales and reputation could suffer.

The nature of our business involves the receipt and storage of information about our customers. We have implemented programs to detect and alert us to data security incidents. However, because the techniques used to obtain unauthorized access, disable or degrade service, or sabotage systems change frequently and may be difficult to detect for long periods of time, we may be unable to anticipate these techniques or implement adequate preventive measures. Companies are increasingly subject to a wide variety of security incidents, cyber-attacks and other attempts to gain unauthorized access. These threats can come from a variety of sources, ranging in sophistication from an individual hacker to malfeasance by employees, consultants or other service providers to state-sponsored attacks. Cyber threats may be generic, or they may be custom-crafted against our information systems. In recent times, cyber-attacks have become more prevalent and much harder to detect and defend against. Our network and storage applications may be vulnerable to cyber-attack, malicious intrusion, malfeasance, loss of data privacy or other significant disruption and may be subject to unauthorized access by hackers, employees, consultants or other service providers. In addition, hardware, software or applications we develop or procure from third parties may contain defects in design or manufacture or other problems that could unexpectedly compromise information security. Unauthorized parties may also attempt to gain access to our systems or facilities through fraud, trickery or other forms of deceiving our employees, contractors and temporary staff. If we experience significant data security breaches or fail to detect and appropriately respond to significant data security breaches, we could be exposed to government enforcement actions and private litigation, as well as potentially incur significant costs and diversion of resources to comply with our contractual obligations to notify our customers of such security breaches, particularly with respect to any protected health information affected. In addition, our customers could lose confidence in our ability to protect their information, which could cause them to discontinue using our products or purchasing from us altogether.

Our use of open source and non-commercial software components could impose risks and limitations on our ability to commercialize our solutions.

Our solutions contain software modules licensed under open source and other types of non-commercial licenses, including the GNU Public License, the Apache License and others. We also may incorporate open source and other licensed software into our solutions in the future. Use and distribution of such software may entail greater risks than use of third-party commercial software, as licenses of these types generally do not provide warranties or other contractual protections regarding infringement claims or the quality of the code. Some of these licenses require the release of our proprietary source code to the public if we combine our proprietary software with open source software in certain manners. This could allow competitors to create similar products with lower development effort and time and ultimately result in a loss of sales for us.

The terms of many open source and other non-commercial licenses have not been judicially interpreted and there is a risk that such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our solutions. In such event, in order to continue offering our solutions, we could be required to seek licenses from alternative licensors, which may not be available on a commercially reasonable basis or at all, to re-engineer our solutions or to discontinue the sale of our solutions in the event we cannot obtain a license or re-engineer our solutions on a timely basis, any of which could harm our business and operating results. In addition, if an owner of licensed software were to allege that we had not complied with the conditions of the corresponding license agreement, we could incur significant legal costs defending ourselves against such allegations. In the event such claims were successful, we could be subject to significant damages, be required to disclose our source code, or be enjoined from the distribution of our solutions.

Claims of intellectual property infringement could harm our business.

Vigorous protection and pursuit of intellectual property rights has resulted in protracted and expensive litigation for many companies in our industry. Although claims of this kind have not materially affected our business to date, there can be no assurance of the absence of such claims in the future. Any claims or proceedings against us, whether meritorious or not, could be time consuming, result in costly litigation, require significant amounts of management time, result in the diversion of significant operational resources, or require us to enter into royalty or licensing agreements, any of which could harm our business and operating results.

Intellectual property lawsuits are subject to inherent uncertainties due to the complexity of the technical issues involved, and we cannot be certain that we will be successful in defending ourselves against intellectual property claims. In addition, we currently have a limited portfolio of issued patents compared to many other industry participants, and therefore may not be able to effectively utilize our intellectual property portfolio to assert defenses or counterclaims in response to patent infringement claims or litigation brought against us by third parties. Further, we are a party to litigation with a patent holding company and it is possible that we will be subject to future litigation with similar entities and other adverse patent owners who have no relevant products and against whom our potential patents may provide little or no deterrence.

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Many potential litigants have the capability to dedicate substantially greater resources to enforce their intellectual property rights and to defend claims that may be brought against them. Furthermore, a successful claimant could secure a judgment that requires us to pay substantial damages or prevents us from distributing certain solutions or performing certain services. We might also be required to seek a license and pay royalties for the use of such intellectual property, which may not be available on commercially acceptable terms or at all. Alternatively, we may be required to develop non-infringing technology, which could require significant effort and expense and may ultimately not be successful.

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

Our success depends, in part, on our ability to protect our proprietary technology. We protect our proprietary technology through patent, copyright, trade secret and trademark laws in the United States and similar laws in other countries. We also protect our proprietary technology through licensing agreements, nondisclosure agreements and other contractual provisions. These protections may not be available in all cases or may be inadequate to prevent our competitors from copying, reverse engineering or otherwise obtaining and using our technology, proprietary rights or solutions in an unauthorized manner. The laws of some foreign countries may not be as protective of intellectual property rights as those in the United States, and mechanisms for enforcement of intellectual property rights may be inadequate. In addition, third parties may seek to challenge, invalidate or circumvent our patents, trademarks, copyrights and trade secrets, or applications for any of the foregoing. Our competitors may independently develop technologies that are substantially equivalent, or superior, to our technology or design around our proprietary rights. In each case, our ability to compete could be significantly impaired.

To prevent unauthorized use of our intellectual property rights, it may be necessary to prosecute actions for infringement or misappropriation of our proprietary rights. Any such action could result in significant costs and diversion of our resources and management's attention, and there can be no assurance that we will be successful in such action. Furthermore, many of our current and potential competitors have the ability to dedicate substantially greater resources to enforce their intellectual property rights than us. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing or misappropriating our intellectual property. While we plan to continue to protect our intellectual property with, among other things, patent protection, there can be no assurance that:

- current or future U.S. or foreign patent applications will be approved;
- our issued patents will protect our intellectual property and not be held invalid or unenforceable if challenged by third parties;
- we will succeed in protecting our technology adequately in all key jurisdictions in which we develop technology, or we or our competitors operate; or
- others will not independently develop similar or competing products or methods or design around any patents that may be issued to us.

Our failure to obtain patents with claims of a scope necessary to cover our technology, or the invalidation of our patents, or our inability to protect any of our intellectual property, may weaken our competitive position and harm our business and operating results. We might be required to spend significant resources to monitor and protect our intellectual property rights. We may initiate claims or litigation against third parties for infringement of our proprietary rights or to establish the validity of our proprietary rights. Any litigation, whether or not it is resolved in our favor, could result in significant expense to us and divert the efforts of our technical and management personnel, which may harm our business, operating results and financial condition.

Product liability or other liability claims could cause us to incur significant costs, adversely affect the sales of our solutions and harm our reputation.

Our solutions are utilized by healthcare professionals and others in the course of providing patient care. As a result patients, family members, physicians, nurses or others may allege we are responsible for harm to patients or

healthcare professionals due to defects in, the malfunction of, the characteristics of, or the operation of, our solutions. Any such allegations could harm our reputation and ability to sell our solutions.

Our solutions utilize lithium-ion batteries and electronic components that may overheat or otherwise malfunction as a result of physical or environmental damage. Components of our solutions emit radio frequency (RF) emissions which have been alleged, in connection with cellular phones, to have adverse health consequences. Magnets in our badges may emit electromagnetic radiation and may be alleged to interfere with implanted medical or other devices. While these components of our solutions comply with applicable guidelines, some may allege that these components of our solutions cause adverse health consequences. Also, applicable guidelines may change making these components of our solutions non-compliant. Any such allegations or non-compliance, or any regulatory developments, could negatively impact the sales of our solutions, require costly modifications to our solutions, and harm our reputation.

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Although our customer agreements contain terms and conditions, including disclaimers of liability, that are intended to reduce or eliminate our potential liability, we could be required to spend significant amounts of management time and resources to defend ourselves against product liability, tort, warranty or other claims. If any such claims were to prevail, we could be forced to pay damages, comply with injunctions or stop distributing our solutions. Even if potential claims do not result in liability to us, investigating and defending against these claims could be expensive and time consuming and could divert management's attention away from our business. We maintain general liability insurance coverage, including coverage for errors and omissions; however, this coverage may not be sufficient to cover large claims against us or otherwise continue to be available on acceptable terms. Further, the insurer could attempt to disclaim coverage as to any particular claim.

We may require additional capital to support our business growth, and such capital may not be available.

We intend to continue to make investments to support business growth and may require additional funds to respond to business challenges, which include the need to develop new solutions or enhance existing solutions, enhance our operating infrastructure, expand our sales and marketing capabilities, expand into non-healthcare markets, and acquire complementary businesses, technologies or assets. Accordingly, we may need to engage in additional equity or debt financing to secure funds. Equity and debt financing, however, might not be available when needed or, if available, might not be available on terms satisfactory to us. If we raise additional funds through equity financing, our stockholders may experience dilution. Debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt. If we are unable to obtain adequate financing or financing on terms satisfactory to us in the future, our ability to continue to support our business growth and to respond to business challenges could be significantly limited as we may have to delay, reduce the scope of or eliminate some or all of our initiatives, which could harm our operating results.

Some of our solutions are, and others could become, subject to regulation by the U.S. Food and Drug Administration or similar foreign agencies, which could increase our operating costs.

We provide certain products that are, and others that may become, subject to regulation by the Food and Drug Administration (FDA) and similar agencies in other countries, or the jurisdiction of these agencies could be expanded in the future to include our solutions. The FDA regulates certain products, including software-based products, as "medical devices" based, in part, on the intended use of the product and the risk the device poses to the patient should the device fail to perform properly. For example, the clinical alert notification solution we acquired as part of our acquisition of Extension Healthcare and the clinical communications product we acquired from mVisum are regulated by the FDA as Class II medical devices. Although we have concluded that our wireless badge is a general-purpose communications device not subject to FDA regulation, the FDA could disagree with our conclusion, or changes in our solutions or the FDA's evolving regulation could lead to FDA regulation of our solutions. Any of our products deemed to be medical devices would be subject to the 2.3% excise tax under the ACA; however, currently there is a moratorium on the medical device tax until January 1, 2020. Canada and many other countries in which we sell or may sell our solutions could also have similar regulations applicable to our solutions, some of which may be subject to change or interpretation. We may incur substantial operating costs if we are required to register our solutions or components of our solutions as regulated medical devices under U.S. or foreign regulations, obtain premarket approval from the FDA or foreign regulatory agencies, and satisfy the extensive reporting requirements. In addition, failure to comply with these regulations could result in enforcement actions and monetary penalties.

Our business is subject to the risks of earthquakes, fire, floods and other natural catastrophic events, and to interruption by man-made problems such as power disruptions or terrorism.

Our corporate headquarters are located in the San Francisco Bay Area, a region known for seismic activity, and many critical components of our solutions are sourced in Asia and Mexico, regions known to suffer natural disasters. A

significant natural disaster, such as an earthquake, fire or a flood, occurring at our headquarters, our other facilities or where our contract manufacturer or its suppliers are located, could harm our business, operating results and financial condition. In addition, acts of terrorism could cause disruptions in our business, the businesses of our customers and suppliers, or the economy as a whole. We also rely on information technology systems to communicate among our workforce located worldwide, and in particular, our senior management, general and administrative, and research and development activities that are coordinated with our corporate headquarters in the San Francisco Bay Area. Any disruption to our internal communications, whether caused by a natural disaster or by man-made problems, such as power disruptions, in the San Francisco Bay Area, Asia or Mexico could delay our research and development efforts, cause delays or cancellations of customer orders or delay deployment of our solutions, which could harm our business, operating results and financial condition.

If we do not maintain effective internal control over financial reporting or disclosure controls and procedures in the future, the accuracy and timeliness of our financial reporting may be adversely affected.

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The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and disclosure controls and procedures quarterly. In particular, we must obtain confidence in our internal control over financial reporting to allow management to report on the effectiveness of our internal control over financial reporting as required by Section 404 of the Sarbanes-Oxley Act. To the extent we find a material weakness or other deficiency in our internal control over financial reporting, the accuracy and timeliness of our financial reporting may be adversely affected.

Multiple negative consequences could ensue if a material weakness in our internal control over financial reporting is identified in the future, or we are not able to comply with the requirements of Section 404 in a timely manner, or we do not maintain effective controls. For example, our reported financial results could be materially misstated or could be restated, we could receive an adverse opinion regarding our controls from our independent registered public accounting firm, or we could be subject to investigations or sanctions by regulatory authorities. All of these outcomes would require additional financial and management resources, and the market price of our stock could decline.

We will continue to incur substantial costs as a result of operating as a public company and our management devotes substantial time to public company compliance obligations.

As a public company, we incur substantial legal, accounting and other expenses. The Sarbanes-Oxley Act, Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 and rules subsequently implemented by the SEC and our stock exchange, impose various requirements on public companies, including certain corporate governance practices. Our management and other personnel devote a substantial amount of time to these compliance requirements. Moreover, these rules and regulations, along with compliance with accounting principles and regulatory interpretations of such principles, as amended by the JOBS Act, have increased and will continue to increase our legal, accounting and financial compliance costs and have made and will continue to make some activities more time-consuming and costly.

We face risks related to securities litigation that could result in significant legal expenses and settlement or damage awards.

We have in the past been, and may in the future become, subject to claims and litigation alleging violations of the securities laws or other related claims, which could harm our business and require us to incur significant costs. For example, a purported securities class action was filed in August 2013 in the United States District Court for the Northern District of California against us and certain of our officers and directors. The suit purported to allege claims for allegedly misleading statements regarding our business and financial results. This suit was settled in 2016. The settlement, which called for payment of $9 million, was funded entirely and directly by our insurance carriers and paid during the three months ended September 30, 2016. Regardless of the outcome, these matters or future litigation may require significant attention from management and could result in significant legal expenses, settlement costs or damage awards that could have a material impact on our financial position, results of operations and cash flows.

The SEC “conflict minerals” rule has caused us to incur additional expenses, could limit the supply and increase the cost of certain metals used in manufacturing our products and could make us less competitive in our target markets.

We are required to disclose the origin, source and chain of custody of specified minerals, known as conflict minerals, that are necessary to the functionality or production of products manufactured or contracted to be manufactured. The SEC requires companies to obtain sourcing data from suppliers, engage in supply chain due diligence and file annually with the SEC a specialized disclosure report on Form SD covering the prior calendar year. The rule could limit our ability to source at competitive prices and to secure sufficient quantities of certain minerals used in the manufacture of our products, as the number of suppliers that provide conflict-free minerals may be limited. In addition, we have incurred, and may continue to incur, costs associated with complying with the rule, such as costs

related to auditing our compliance with the rules, costs related to the determination of the origin, source and chain of custody of the minerals used in our products, the adoption of conflict minerals-related governance policies, processes and controls and possible changes to products or sources of supply as a result of such activities. Within our supply chain, we may not be able to sufficiently verify the origins of the relevant minerals used in our products through the data collection and due diligence procedures that we implement, which may harm our reputation. Furthermore, we may encounter challenges in satisfying those customers that require that all of the components of our products be certified as conflict free, and if we cannot satisfy these customers, they may choose a competitor’s products. We continue to investigate the presence of conflict materials within our supply chain.

Risks Related to the Notes

We have indebtedness in the form of convertible senior notes.

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As a result of the Notes offering, we incurred $143.75 million principal amount of indebtedness, the principal amount of which we may be required to pay at maturity in 2023. Holders of the Notes will have the right to require us to repurchase their Notes upon the occurrence of a "fundamental change" (as defined in the indenture governing the Notes) at a purchase price equal to 100% of the principal amount of the Notes to be purchased, plus accrued and unpaid interest, if any. In addition, the indenture for the Notes provides that we are required to repay amounts due under the indenture in the event that there is an event of default for the Notes that results in the principal, premium, if any, and interest, if any, becoming due prior to maturity date of the Notes. There can be no assurance that we will be able to repay this indebtedness when due, or that we will be able to refinance this indebtedness on acceptable terms or at all. In addition, this indebtedness could, among other things:

- heighten our vulnerability to adverse general economic conditions and heightened competitive pressures;
- require us to dedicate a larger portion of our cash flow from operations to interest payments, limiting the availability of cash for other purposes;
- limit our flexibility in planning for, or reacting to, changes in our business and industry; and
- impair our ability to obtain additional financing in the future for working capital, capital expenditures, acquisitions, general corporate purposes or other purposes.

In addition, our ability to purchase the Notes or repay prior to maturity any accelerated amounts under the Notes upon an event of default or pay cash upon conversions of the Notes may be limited by law, by regulatory authority or by agreements governing our indebtedness outstanding at the time. Our failure to repurchase Notes at a time when the repurchase is required by the indenture (whether upon a fundamental change or otherwise under the indenture) or pay cash payable on future conversions of the Notes (unless we elect to deliver solely shares of our common stock to settle such conversion) as required by the indenture would constitute a default under the indenture. A default under the indenture or the fundamental change itself could also lead to a default under agreements governing any future indebtedness. If the repayment of any related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness, repurchase the Notes or make cash payments upon conversions thereof.

Provisions in the indenture for the notes may deter or prevent a business combination that may be favorable to you.

If a fundamental change occurs prior to the maturity date of the Notes, holders of the Notes will have the right, at their option, to require us to repurchase all or a portion of their Notes. In addition, if a make-whole fundamental change occurs prior to the maturity date, we will in some cases be required to increase the conversion rate for a holder that elects to convert its notes in connection with such make-whole fundamental change. Furthermore, the indenture for the Notes prohibits us from engaging in certain mergers or acquisitions unless, among other things, the surviving entity assumes our obligations under the Notes. These and other provisions in the indenture could deter or prevent a third party from acquiring us even when the acquisition may be favorable to our stockholders.

The accounting method for convertible debt securities that may be settled in cash, such as the Notes, could have a material effect on our reported financial results.

Under Accounting Standards Codification 470-20, Debt with Conversion and Other Options (ASC 470-20), an entity must separately account for the liability and equity components of the convertible debt instruments (such as the Notes) that may be settled entirely or partially in cash upon conversion in a manner that reflects the issuer's economic interest cost. The effect of ASC 470-20 on the accounting for the Notes is that the equity component is required to be included in the additional paid-in capital section of stockholders' equity on our consolidated balance sheet at the issuance date and the value of the equity component would be treated as debt discount for purposes of accounting for the debt component of the Notes. We are required to record a non-cash interest expense for the amortization of this debt discount for the term of the Notes which will adversely affect our financial results while the Notes are outstanding.

In addition, under certain circumstances, convertible debt instruments (such as the Notes) that may be settled entirely or partly in cash may be accounted for utilizing the treasury stock method, the effect of which is that the shares issuable upon conversion of such Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion value of such Notes exceeds their principal amount. Under the treasury stock method, for diluted earnings per share purposes, the transaction is accounted for as if the number of shares of common stock that would be necessary to settle such excess, if we elected to settle such excess in shares, are issued. We cannot be sure that the accounting standards in the future will continue to permit the use of the treasury stock method. If we are unable, or otherwise elect not to, use the treasury stock method in accounting for the shares issuable upon conversion of the Notes, then our diluted earnings per share could be adversely affected.

The capped call transactions may affect the value of the Notes and our common stock.

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In connection with the issuance of the Notes, we entered into capped call transactions with certain financial institutions (the option counterparties). The capped call transactions are expected generally to reduce the potential dilution upon any conversion of the Notes and/or offset any cash payments we are required to make in excess of the principal amount upon conversion of the Notes, with such reduction and/or offset subject to a cap. In connection with establishing their initial hedges of the capped call transactions, the option counterparties and/or their respective affiliates purchased shares of our common stock and/or entered into various derivative transactions with respect to our common stock. This activity could have increased (or reduced the size of any decrease in) the market price of our common stock or the Notes at that time. In addition, the option counterparties and/or their respective affiliates may modify their hedge positions by entering into or unwinding various derivatives with respect to our common stock and/or purchasing or selling our common stock in secondary market transactions (and are likely to do so during any observation period related to a conversion of notes or following any repurchase of notes by us on any fundamental change repurchase date or otherwise). This activity could also cause or avoid an increase or a decrease in the price of our common stock or the Notes. The potential effect, if any, of these transactions and activities on the price of our common stock or the Notes will depend in part on market conditions and cannot be ascertained at this time. Any of these activities could adversely affect the value of our common stock.

Risks related to our common stock

The market price of our common stock has been, and may continue to be, volatile, and your investment in our stock could suffer a decline in value.

There has been significant volatility in the market price and trading volume of equity securities, which is often unrelated or disproportionate to the financial performance of the companies issuing the securities. These broad market fluctuations may negatively affect the market price of our common stock. The market price of our common stock could fluctuate significantly in response to the factors described in this “Risk Factors” section and elsewhere in this Form 10-K and other factors, many of which are beyond our control, including:

- actual or anticipated variation in anticipated operating results of us or our competitors;
- the financial projections we may provide to the public, any changes in these projections or our failure to meet these projections;
- announcements by us or our competitors of new solutions, new or terminated significant contracts, commercial relationships or capital commitments;
- changes in the regulatory environment affecting our healthcare customers, including impediments to their ability to obtain reimbursement for their services, and other actual or anticipated legal or regulatory developments in the United States or foreign countries;
- actual or anticipated developments in our competitors’ businesses or the competitive landscape generally;
- failure of securities analysts to maintain coverage of us, changes in financial estimates by any securities analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- developments or disputes concerning our intellectual property or other proprietary rights;
- commencement of, or our involvement in, litigation;
- announced or completed acquisitions of businesses, technologies or assets by us or our competitor;
- changes in operating performance and stock market valuations of other technology companies generally, or those in our industry in particular;
- price and volume fluctuations attributable to inconsistent trading volume levels of our common stock;
- our decision to seek additional equity or debt financing;
- our public float relative to the total number of shares of our common stock that are issued and outstanding;
- price and volume fluctuations in the overall stock market, including as a result of trends in the economy as a whole;
- rumors and market speculation involving us or other companies in our industry;
- the dissemination of adverse or misleading reports or opinions about our business;
- any major change in our management;

- unfavorable economic conditions and slow or negative growth of our markets; and
- other events or factors, including those resulting from war or incidents of terrorism.

If securities or industry analysts issue an adverse or misleading opinion regarding our stock or do not publish research or reports about our business, our stock price could decline.

The trading market for our common stock depends in part on the research and reports that securities or industry analysts publish about us and our business. We do not control these analysts or the content and opinions included in their reports. The price of our common stock could decline if one or more analysts downgrade our common stock or if those analysts issue other unfavorable commentary or cease publishing reports about us or our business. If one or more analysts cease coverage of our company or fail

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to regularly publish reports about our company, we could lose visibility in the financial market, which in turn could cause our stock price to decline. Further, securities or industry analysts may elect not to provide research coverage of our common stock and such lack of research coverage may adversely affect the market price of our common stock.

We have never paid cash dividends on our capital stock, and we do not anticipate paying any dividends in the foreseeable future.

We have never paid cash dividends on any of our capital stock and currently intend to retain our future earnings to fund the development and growth of our business. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for the foreseeable future.

Our charter documents and Delaware law could discourage, delay or prevent a change of control of our company or change in our management that stockholders consider favorable and cause our stock price to decline.

Certain provisions of our restated certificate of incorporation and restated bylaws and Delaware law could discourage, delay or prevent a change of control of our company or change in our management that the stockholders of our company consider favorable. These provisions:

- authorize the issuance of “blank check” preferred stock that our board of directors could issue to increase the number of outstanding shares and to discourage a takeover attempt;
- prohibit stockholder action by written consent, requiring all stockholder actions to be taken at a meeting of stockholders;
- establish advance notice procedures for nominating candidates to our board of directors or proposing matters that can be acted upon by stockholders at stockholder meetings;
- limit the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholders from cumulating their votes for the election of directors;
- permit newly created directorships resulting from an increase in the authorized number of directors or vacancies on our board of directors to be filled only by majority vote of our remaining directors, even if less than a quorum is then in office;
- provide that our board of directors is expressly authorized to make, alter or repeal our bylaws;
- establish a classified board of directors so that not all members of our board are elected at one time;
- provide that our directors may be removed only for “cause” and only with the approval of the holders of at least 66 2/3rds percent of our outstanding stock; and
- require super-majority voting to amend certain provisions in our certificate of incorporation and bylaws.

Section 203 of the Delaware General Corporation Law may also discourage, delay or prevent a change of control of our company.

Item 1B. Unresolved Staff Comments

None

Item 2. Properties

We do not currently own any of our facilities. The following table sets forth the location, approximate size, primary use and lease expiration dates of our leased facilities. Our facilities are in good operating condition and adequately serve our business needs.

Location	Approximate square feet	Primary use	Lease expiration date
San Jose, California	70,000	Corporate headquarters and product warehousing	March 31, 2022
Fort Wayne, Indiana	27,860	Development, sales and support	February 28, 2023
Knoxville, Tennessee	546	Development, sales and support	January 31, 2019

San Francisco, California	3,054	Vocera Care Experience offices	May 31, 2019
Toronto, Canada	4,578	Development, sales and support	April 30, 2021
Reading, United Kingdom	865	Sales and support	December 31, 2020
Bangalore, India	20,734	Development	July 24, 2022
Dubai, United Arab Emirates	950	Sales and support	December 20, 2019

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Item 3. Legal Proceedings

We are currently, and may from time to time be, involved in lawsuits, claims, investigations and proceedings, consisting of intellectual property, commercial, employment and other matters which arise in the ordinary course of business.

Item 4. Mine Safety Disclosures

None.

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PART II

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

Market Information

Our common stock has been listed on the New York Stock Exchange under the symbol "VCRA" since March 28, 2012.

Holders of Common Stock

As of February 25, 2019, we had 42 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. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

Dividend policy

We have never declared or paid any cash dividends on our capital stock, and we do not currently intend to pay any cash dividends on our common stock for the foreseeable future. We expect to retain future earnings, if any, to fund the development and growth of our business. Any future determination to pay dividends on our common stock will be at the discretion of our board of directors and will depend upon, among other factors, our financial condition, operating results, current and anticipated cash needs, plans for expansion and other factors that our board of directors may deem relevant.

Stock Performance

This stock performance graph shall not be deemed "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of Vocera Communications, Inc. under the Securities Act or the Exchange Act.

The following stock performance graph compares the cumulative total return provided to holders of the common stock of Vocera Communications, Inc. relative to the cumulative total returns of the New York Stock Exchange Composite Index and the Standard & Poor's 1500 Health Care Technology Index over a five year period. An investment of $100 is assumed to have been made in our common stock and in each of the indexes on December 31, 2013, including reinvestment of dividends, and its relative performance is tracked through December 31, 2018.

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	12/31/13	12/31/14	12/31/15	12/31/16	12/31/17	12/31/18
Vocera Communications Inc.	100.00	66.75	78.16	118.45	193.59	252.08
NYSE Composite	100.00	106.75	102.38	114.61	136.07	123.89
S&P Health Care Technology	100.00	116.00	107.95	84.98	120.90	94.08

Issuer Purchases of Equity Securities

During the three months ended December 31, 2018, we did not repurchase any of our securities.

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Item 6. Selected Financial Data

The following selected consolidated financial data should be read in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and related notes included in Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K. The selected consolidated financial data in this section are not intended to replace the consolidated financial statements and are qualified in their entirety by the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

We derived the consolidated statement of operations data for the years ended December 31, 2018, 2017 and 2016 and the consolidated balance sheet data as of December 31, 2018 and 2017 from our audited financial statements included elsewhere in this report. We derived the consolidated statement of operations data for the years ended December 31, 2015 and 2014 and the consolidated balance sheet data as of December 31, 2016, 2015 and 2014 from our audited consolidated financial statements that do not appear in this report. Our historical results are not necessarily indicative of the results to be expected in the future.

For the fiscal years ended December 31, 2017 and 2016, we have recast certain of the following financial data as a result of our adoption of Accounting Standard Update 2014-09, Revenue from Contracts with Customers (ASC 606) in the first quarter of fiscal 2018, as indicated by the "as adjusted" note. Financial data for the years ended December 31, 2015 and 2014 has not been adjusted to reflect the adoption of ASC 606. See Note 2 of Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for further information regarding our adoption of ASC 606.

	Years ended December 31,				
(in thousands, except per share data)	2018	2017 *As adjusted	2016 *As adjusted	2015	2014
Consolidated statements of operations data:					
Total revenue	$179,630	$165,989	$132,026	$95,421	$102,498
Gross profit	111,887	101,062	82,951	58,185	64,189
Net (loss) income	(9,674)	(10,897)	(11,400)	(28,297)	(10,465)
Net (loss) income attributable to common stockholders	$(9,674)	$(10,897)	$(11,400)	$(28,297)	$(10,465)
Net (loss) income per share attributable to common stockholders					
Basic and diluted	$(0.32)	$(0.38)	$(0.42)	$(1.12)	$(0.43)
Weighted average shares used to compute net (loss) income per share attributable to common stockholders					
Basic and diluted	30,041	28,655	26,859	25,329	24,621

	As of December 31,				
(in thousands)	2018	2017 *As adjusted	2016 *As adjusted	2015	2014
Consolidated balance sheet data:					
Cash, cash equivalents and short-term investments	$221,170	$81,233	$74,066	$116,774	$116,261
Total assets	352,098	204,973	192,495	162,261	159,628
Long-term debt	110,540	—	—	—	—
Total stockholders’ equity	162,867	128,000	119,146	104,431	109,712

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

The following discussion and analysis of our financial condition and results of operations should be read together with our consolidated financial statements and related notes included in Item 8, “Financial Statements and Supplementary Data” included in this Annual Report on Form 10-K. This discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions, such as statements of our plans, objectives, expectations and intentions. The cautionary statements made in this Annual Report on Form 10-K should be read as applying to all related forward-looking statements wherever they appear in this Annual Report on Form 10-K. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of many factors, including but not limited to those set forth under Item 1A, “Risk factors” and elsewhere in this Annual Report on Form 10-K.

Business overview

We are a provider of secure, integrated, intelligent communication solutions, focused on empowering mobile workers in healthcare, hospitality, energy, and other mission-critical mobile work environments, in the United States and internationally. Today, the significant majority of our business is generated from sales of our solutions in the healthcare market to help our customers enhance patient safety and experience, improve staff resiliency and increase operational efficiency. As of December 31, 2018, care teams at approximately 1,600 healthcare facilities worldwide have selected our solutions.

We primarily sell products, software maintenance and professional services directly to end users. Total revenue increased 8.2% to $179.6 million in 2018 from $166.0 million in 2017, and our 2017 revenue increased 25.7% from $132.0 million in 2016. For the year ended December 31, 2018, we recorded a net loss of $9.7 million compared to a net loss of $10.9 million for the year ended December 31, 2017.

Our diverse customer base ranges from large hospital systems to small local hospitals, as well as other healthcare facilities and customers in non-healthcare markets. We do not rely on any one customer for a substantial portion of our revenue. While we have international customers in other English-speaking countries such as Canada, the United Kingdom, Australia, New Zealand and parts of the Middle East, most of our customers are located in the United States. International customers represented 10.2% and 10.2% of our revenue in 2018 and in 2017, respectively. We believe certain international markets represent attractive growth opportunities. We are exploring plans to expand our presence in other English-speaking markets and enter non-English speaking markets.

We outsource the manufacturing of our hardware products. Our outsourced manufacturing model allows us to scale our business without the significant capital investment and on-going expenses required to establish and maintain manufacturing operations. We work closely with our contract manufacturers, including Sercomm Corporation and SMTC Corporation, and key suppliers to manage the procurement, quality and cost of components. We seek to maintain an optimal level of finished goods inventory to meet our forecast for sales and unanticipated shifts in sales volume and mix.

In the fourth quarter of 2016, we acquired all of the outstanding equity interest of Extension Healthcare for $52.5 million in cash. In addition, $2.5 million has been set aside for retention bonuses for key employees of which $0.5 million and $1.0 million was paid in December 2016 and October 2017, respectively and the remaining $.5 million due was paid in October 2018.

In May 2014, the FASB together with the International Accounting Standards Board issued converged guidance for revenue recognition that will replace most existing guidance, eliminate industry-specific guidance and provide a unified model for determining how and when revenue from contracts with customers should be recognized. Under the new guidance, an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services.

The new guidance permits two methods of adoption: retrospectively to each prior reporting period presented (full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (modified retrospective method).

We adopted the new guidance on January 1, 2018 using the full retrospective method, which requires us to present our historical financial information for fiscal years 2017 and 2016 as if the new revenue guidance had been applied to all

prior periods.

The most significant impact of the standard relates to the timing of revenue recognition for software licenses sold with professional services where we did not have vendor specific objective evidence (VSOE) for professional services under current guidance. Under the new standard, the requirement to have VSOE for undelivered elements is eliminated and we will recognize revenue for software licenses upon transfer of control to our customers. Additionally, the new standard requires the capitalization and amortization of costs related to obtaining a contract, such as sales commissions, which are currently recorded as an expense to sales and marketing at the time they are incurred.

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The adoption of the standard resulted in the recognition of additional revenue of $3.4 million and $4.3 million for the years ended December 31, 2017 and 2016, respectively, an increase in gross profit of $3.4 million and $4.3 million for the years ended December 31, 2017 and 2016, respectively, an increase (decrease) in sales and marketing expense of $0.1 million and $(1.5) million for the years ended December 31, 2017 and 2016, respectively, and a decrease in loss from operations of $3.3 million and $5.9 million for the years ended December 31, 2017 and 2016, respectively. In addition, the adoption of the standard resulted in a decrease in total net deferred revenue of $8.5 million and $5.3 million as of December 31, 2017 and 2016, respectively, driven by the upfront recognition of software licenses sold with professional services for which we do not have VSOE, and an increase in total deferred commissions of $10.3 million and $10.4 million as of December 31, 2017 and 2016, respectively, which will be recognized in sales and marketing expense in future periods. The adoption of the standard has not had a significant impact to the provision for income taxes and has not had an impact on net cash from or used in operating, investing, or financing activities on our consolidated statements of cash flows. Refer to Note 2 in the Notes to Consolidated Financial Statements for the impact of adoption of the standard on the Company's consolidated balance sheets and consolidated statements of operations.

Convertible Senior Notes

In May 2018, we issued $143.75 million aggregate principal amount of 1.50% Convertible Senior Notes due 2023, including $18.75 million aggregate principal amount of such notes pursuant to the exercise in full of options granted to the initial purchasers, collectively the “Notes.” The total net proceeds from the offering, after deducting initial purchase discounts and debt issuance costs, were approximately $138.9 million.

In connection with the pricing of the Notes, we entered into privately negotiated capped call transactions with certain counterparties, the “Capped Calls.” The Capped Calls each have an initial strike price of approximately $32.25 per share, subject to certain adjustments, which correspond to the initial conversion price of the Notes. The Capped Calls have initial cap prices of $38.94 per share, subject to certain adjustments. The Capped Calls cover, subject to anti-dilution adjustments, approximately 4.5 million shares of our common stock. We used proceeds of $8.9 million to purchase the Capped Calls, which were recorded as a reduction to additional paid-in capital. For further discussion on the Capped Calls, please refer to Note 8 in the Notes to Consolidated Financial Statements.

We expect to use the remaining net proceeds for general corporate purposes, which may include funding research and development, increasing working capital, acquisitions or investments in complementary businesses, products or technologies and capital expenditures.

New Accounting Standards

We adopted Accounting Standards Update (ASU) 2014-09, Revenue from Contracts with Customers (Topic 606) (ASC 606), the new accounting standard related to revenue recognition, effective January 1, 2018. Prior period information presented has been adjusted to reflect the adoption of this new standard. See Note 2 of Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K for a summary of adjustments.

Components of operating results

Revenue. We generate revenue from the sale of products and services. As discussed further in the section titled “Critical accounting policies and estimates—Revenue recognition” below, revenue is recognized when persuasive evidence of an arrangement exists, delivery has occurred, the price is fixed or determinable and collection is reasonably assured.

Revenue is comprised of the following:

- Product. Our solutions include both hardware and software. We refer to hardware revenue as device revenue, which includes revenue from sales of our communication badges and badge accessories, which include batteries, battery chargers, lanyards, clips and other ancillary badge components as well as revenue from the resale of TC51devices and related accessories. Software revenue is derived primarily from the sale of perpetual licenses to our Vocera Communication and Workflow System. We derive additional software revenue from the sale of term licenses and hosted software subscriptions, which can be renewed on a subscription basis. Product revenue is generally recognized

upon shipment of hardware and perpetual licenses and, in the case of term licenses or subscription services, ratably over the applicable term.

- Service. We receive service revenue from sales of software maintenance, extended hardware warranties and professional services. Software maintenance is typically invoiced annually in advance, recorded as deferred revenue, and recognized as revenue ratably over the service period. Our professional services revenue is based on both time and materials, and fixed price contracts, and is recognized as the services are provided. Extended warranties are invoiced in advance, recorded as deferred revenue, and recognized ratably over the extended warranty period.

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Cost of revenue. Cost of revenue is comprised of the following:

- Cost of product. Cost of product is comprised primarily of materials costs, software license costs, write-offs for excess and obsolete inventory, warranty, and manufacturing overhead costs for test engineering, material requirements planning and our shipping and receiving functions. These overhead costs also include facilities, equipment depreciation, amortization of developed technology and stock-based compensation expenses. We expect material costs to vary with the product life cycle of our devices.

Cost of service. Cost of service is comprised primarily of employee wages, benefits and related personnel expenses of our technical support team, our professional consulting personnel and our training teams. Cost of service also includes facility and information technology costs. We expect our cost of service will increase as we continue to invest in support services to meet the needs of our customer base.

Operating expenses. Operating expenses are comprised of the following:

- Research and development. Research and development expenses consist primarily of employee wages, benefits and related personnel expenses, hardware materials, and consultant fees and expenses related to the design, development, testing and enhancements of our solutions. We intend to continue to invest in improving the functionality of our solutions and the development of new solutions.
- Sales and marketing. Sales and marketing expenses consist primarily of employee wages, benefits and related personnel expenses, as well as trade shows, marketing programs and collateral and public relations programs.
- General and administrative. General and administrative expenses consist primarily of employee wages, benefits and related personnel expenses, consulting, accounting fees, legal fees and other general corporate expenses.

Interest income and other income (expense), net.

- Interest income. Interest income consists primarily of interest income earned on our cash, cash equivalent and short-term investment balances. Our interest income will vary each reporting period depending on our average cash, cash equivalent and short-term investment balances during the period and market interest rates.
- Interest expense. Interest expense consists of amortization of debt discount and debt issuance costs as well as the contractual interest incurred of the issuance of the Convertible Senior Notes which are discussed in further detail in Note 8 to the consolidated financial statements.
- Other income (expense), net. Other income (expense), net consists primarily of foreign exchange gains and losses.

Provision for income taxes. We are subject to income taxes in the countries where we sell our solutions. We anticipate that in the future as we expand our sale of solutions to customers outside the United States, we will become subject to taxation based on the foreign statutory rates in the countries where these sales took place and our effective tax rate could fluctuate accordingly. Currently, each of our international subsidiaries is operating under cost plus agreements where the U.S. parent company reimburses the international subsidiary for its costs plus an arm's length profit.

Income taxes are computed using the asset and liability method, under which deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to affect taxable income. Valuation allowances have been established to reduce deferred tax assets to the amount reasonably expected to be realized. Changes in valuation allowances are reflected as a component of provision for income taxes.

At December 31, 2018, we held a $40.1 million valuation allowance against our deferred tax assets. We review on a quarterly basis our conclusions about the appropriate amount of our deferred income tax asset valuation allowance.

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Results of operations

The following table is a summary of our consolidated statements of operations for the years ended December 31, 2018, 2017 and 2016.

	Years ended December 31,					
	2018		2017		2016	
(in thousands, except percentages)	Amount	% Revenue	Amount	% Revenue	Amount	% Revenue
Consolidated statements of operations data:						
Revenue						
Product	$97,447	54.2 %	$91,585	55.2 %	$74,235	56.2 %
Service	82,183	45.8	74,404	44.8	57,791	43.8
Total revenue	179,630	100.0	165,989	100.0	132,026	100.0
Cost of revenue						
Product	27,425	15.3	27,244	16.4	22,788	17.3
Service	40,318	22.4	37,683	22.7	26,287	19.9
Total cost of revenue	67,743	37.7	64,927	39.1	49,075	37.2
Gross profit	111,887	62.3	101,062	60.9	82,951	62.8
Operating expenses						
Research and development	30,879	17.2	27,685	16.7	18,266	13.8
Sales and marketing	62,214	34.6	60,107	36.2	51,274	38.8
General and administrative	25,099	14.0	23,970	14.4	24,499	18.6
Total operating expenses	118,192	65.8	111,762	67.3	94,039	71.2
Loss from operations	(6,305)	(3.5)	(10,700)	(6.4)	(11,088)	(8.4)
Interest income	3,044	1.6	604	0.3	684	0.6
Interest expense	(5,241)	(2.9)	—	—	—	—
Other expense, net	(1,523)	(0.8)	(42)	—	(467)	(0.4)
Loss before income taxes	(10,025)	(5.6)	(10,138)	(6.1)	(10,871)	(8.2)
Provision for income taxes	351	0.2	(759)	(0.5)	(529)	(0.4)
Net loss	$(9,674)	(5.4)%	$(10,897)	(6.6)%	$(11,400)	(8.6)%

Year ended December 31, 2018 compared to year ended December 31, 2017

Revenue:

	Years ended December 31,			
	2018	2017	Change	
(in thousands, except percentages)	Amount	Amount	Amount	%
Product Revenue				
Device	$60,130	$61,746	$(1,616)	(2.6)%
Software	37,317	29,839	7,478	25.1
Total product revenue	97,447	91,585	5,862	6.4
Service revenue				
Maintenance and support	62,267	52,342	9,925	19.0
Professional services and training	19,916	22,062	(2,146)	(9.7)
Total service revenue	82,183	74,404	7,779	10.5
Total revenue	$179,630	$165,989	$13,641	8.2 %

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Total revenue increased $13.6 million, or 8.2%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. The increase in total revenue was a result of increases in both product and services revenue.

Product revenue increased $5.9 million, or 6.4%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. Device revenue decreased $1.6 million, or 2.6%, and software revenue increased $7.5 million, or 25.1%, for the year ended December 31, 2018, compared to the year ended December 31, 2017. The decrease in device revenue was driven primarily by a decrease in unit sales of badges and related accessories to new customers making initial purchases and existing customers expanding deployments within their facilities to departments and users. The increase in software revenue was mainly a result of an increase in unit sales of licenses of our software platform.

Service revenue increased $7.8 million, or 10.5%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. Software maintenance and support revenue increased $9.9 million, or 19.0%, and professional services and training revenue decreased $2.1 million, or 9.7%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. The increase in software maintenance and support revenue was primarily a result of having a larger customer base. The decrease in professional services and training revenue was due to a decrease of implementation services for our solutions.

Cost of revenue:

	Years ended December 31,			
	2018	2017	Change	
(in thousands, except percentages)	Amount	Amount	Amount	%
Cost of revenue				
Product	$27,425	$27,244	$181	0.7%
Service	40,318	37,683	2,635	7.0
Total cost of revenue	$67,743	$64,927	$2,816	4.3%
Gross margin				
Product	71.9 %	70.3 %	1.6 %	
Service	50.9	49.4	1.5	
Total gross margin	62.3 %	60.9 %	1.4 %	

Cost of product revenue increased $0.2 million, or 0.7%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. The cost of product revenue increased primarily due to an increase of fixed overhead costs. Product gross margin as a percentage of product revenue increased in the year ended December 31, 2018 compared to the year ended December 31, 2017 due to a larger mix of software revenue and higher absorption of fixed overhead costs.

Cost of service revenue increased $2.6 million, or 7.0%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. The cost of service revenue increased primarily due to an increase in headcount. Service gross margin as a percentage of service revenue increased for the year ended December 31, 2018 compared to the year ended December 31, 2017 primarily due to an increase in software maintenance and support revenue which typically yields higher margins.

Operating expenses:

	Years ended December 31,			
	2018	2017	Change	
(in thousands, except percentages)	Amount	Amount	Amount	%
Operating expenses:				
Research and development	$30,879	$27,685	$3,194	11.5%
Sales and marketing	62,214	60,107	2,107	3.5
General and administrative	25,099	23,970	1,129	4.7

Total operating expenses	$118,192	$111,762	$6,430	5.8 %

Research and development expense. Research and development expense increased $3.2 million, or 11.5%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. This increase was primarily due to a $2.0 million increase in compensation and benefits associated with increased headcount as well as a $1.2 million increase in outside services primarily related to the development of our new Smartbadge announced in January 2019.

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Sales and marketing expense. Sales and marketing expense increased $2.1 million, or 3.5%, for the year ended December 31, 2018 compared to the year ended December 31, 2017. This was primarily due to a $0.9 million increase in compensation and benefits associated with increased headcount. The sales and marketing expense increase was also due to a $1.1 million increase in marketing development costs related to the launch of our new Smartbadge in January 2019.

General and administrative expense. General and administrative expense increased $1.1 million, or 4.7%, from the year ended December 31, 2018 compared to the year ended December 31, 2017. This primarily resulted from a $1.0 million increase in outside services and a $0.1 million increase in travel and entertainment.

	Years ended December 31,		
(in thousands, except percentages)	2018	2017	Change
Non-operating income (expense) elements:			
Interest income	$3,044	$604	$2,440
Interest expense	(5,241)	—	(5,241)
Other expense, net	(1,523)	(42)	(1,481)
Income taxes:			
Provision for income taxes	351	(759)	1,110
Loss before income taxes	(10,025)	(10,138)	113
Effective tax rate %	3.5%	(7.5)%	11.0%

Interest income. Interest income increased $2.4 million for the year ended December 31, 2018 compared to the year ended December 31, 2017. This increase was due to having higher cash balances as a result of the issuance of the Notes combined with a higher rate of return on our investments. For further discussion on the Notes, please refer to Note 8 to the Consolidated Financial Statements.

Interest expense. For the year ended December 31, 2018, we had interest expense of $5.2 million resulting from the amortization of debt discount and debt issuance costs and the contractual interest incurred on the issuance of the Notes.

Other expense, net. The change in other expense, net for the year ended December 31, 2018 compared to the year ended December 31, 2017 was primarily due to foreign exchange fluctuations.

Provision for income taxes. The $0.4 million benefit on $10.0 million of loss before income taxes in 2018 represented an effective tax rate of 3.5%. The tax benefit for 2018 was due primarily to tax losses benefited against deferred tax liabilities as a result of teh enactment of the Tax Cuts and Jobs Act, partially offset by income taxes on our foreign operations. The negative effective tax rate of 7.5% in 2017 was due primarily to the re-measurement of the net deferred tax liabilities, resulting in a deferred tax benefit of $0.8 million upon the enactment of the Tax Cuts and Jobs Act as well as the impact of pre-tax losses in the U.S. operations, partially offset by income taxes on our foreign operations.

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Year ended December 31, 2017 compared to year ended December 31, 2016

Revenue:

	Years ended December 31,			
	2017	2016	Change	
(in thousands, except percentages)	Amount	Amount	Amount	%
Product Revenue				
Device	$61,746	$50,614	$11,132	22.0%
Software	29,839	23,621	6,218	26.3
Total product revenue	91,585	74,235	17,350	23.4
Service revenue				
Maintenance and support	52,342	43,408	8,934	20.6
Professional services and training	22,062	14,383	7,679	53.4
Total service revenue	74,404	57,791	16,613	28.7
Total revenue	$165,989	$132,026	$33,963	25.7%

Total revenue increased $34.0 million, or 25.7%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The increase in total revenue was a result of increases in both product and services revenue.

Product revenue increased $17.4 million, or 23.4%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. Device revenue increased $11.1 million, or 22.0%, and software revenue increased $6.2 million, or 26.3%, for the year ended December 31, 2017, compared to the year ended December 31, 2016. The increase in device revenue, which related entirely to our Communication and Workflow System, was driven primarily by an increase in unit sales of badges and related accessories to new customers making initial purchases and existing customers expanding deployments within their facilities to departments and users. The increase in software revenue was mainly a result of an increase in unit sales of licenses of our software platform.

Service revenue increased $16.6 million, or 28.7%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. Software maintenance and support revenue increased $8.9 million, or 20.6%, and professional services and training revenue increased $7.7 million, or 53.4%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The increase in software maintenance and support revenue was primarily a result of having a larger customer base. The increase in professional services and training revenue was due to an increase of implementation services for our solutions.

Cost of revenue:

Years ended December 31,