CALIX, INC
Form 10-Q
May 01, 2019

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-Q

(Mark One)
x QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the quarterly period ended March 30, 2019
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: 001-34674

Calix, Inc.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	68-0438710
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

2777 Orchard Parkway, San Jose, CA 95134
(Address of Principal Executive Offices) (Zip Code)
(408) 514-3000
(Registrant’s Telephone Number, Including Area Code)

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 pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes: x No: o

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

Large Accelerated Filer	o	Accelerated Filer	x
Non-accelerated filer	o	Smaller Reporting Company	o
Emerging Growth Company	o		

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

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

As of April 24, 2019, there were 54,296,910 shares of the Registrant's common stock, par value $0.025 outstanding.

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PART I. FINANCIAL INFORMATION

ITEM 1. Financial Statements
CALIX, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(In thousands, except par value)

	March 30, 2019 (Unaudited)	December 31, 2018 (See Note 1)
ASSETS		
Current assets:		
Cash and cash equivalents	$ 44,067	$ 49,646
Restricted cash	628	628
Accounts receivable, net	55,202	67,026
Inventory	47,226	50,151
Prepaid expenses and other current assets	9,961	7,306
Total current assets	157,084	174,757
Property and equipment, net	26,372	24,945
Right-of-use operating leases	17,062	—
Goodwill	116,175	116,175
Other assets	1,459	1,203
	$ 318,152	$ 317,080
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 34,326	$ 40,209
Accrued liabilities	55,343	57,869
Deferred revenue	15,564	15,600
Line of credit	30,000	30,000
Total current liabilities	135,233	143,678
Long-term portion of deferred revenue	18,252	17,496
Operating leases	15,692	—
Other long-term liabilities	3,134	3,972
Total liabilities	172,311	165,146
Commitments and contingencies (See Note 6)		
Stockholders' equity:		
Preferred stock, $0.025 par value; 5,000 shares authorized; no shares issued and outstanding as of March 30, 2019 and December 31, 2018	—	—
Common stock, $0.025 par value; 100,000 shares authorized; 59,494 shares issued and 54,164 shares outstanding as of March 30, 2019, and 59,285 shares issued and 53,955 shares outstanding as of December 31, 2018	1,488	1,482
Additional paid-in capital	879,475	876,073
Accumulated other comprehensive loss	(487)	(753)
Accumulated deficit	(694,649)	(684,882)
Treasury stock, 5,330 shares as of March 30, 2019 and December 31, 2018	(39,986)	(39,986)
Total stockholders' equity	145,841	151,934
	$ 318,152	$ 317,080

See accompanying notes to condensed consolidated financial statements.

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CALIX, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(In thousands, except per share data)
(Unaudited)

	Three Months Ended	
	March 30, 2019	March 31, 2018
Revenue:		
Systems	$82,360	$93,291
Services	6,990	6,112
Total revenue	89,350	99,403
Cost of revenue:		
Systems [1]	44,601	51,633
Services [1]	6,406	5,711
Total cost of revenue	51,007	57,344
Gross profit	38,343	42,059
Operating expenses:		
Research and development [1]	19,330	25,536
Sales and marketing [1]	19,339	19,901
General and administrative [1]	8,787	9,095
Restructuring charges	—	5,340
Gain on sale of product line	—	(6,704)
Total operating expenses	47,456	53,168
Loss from operations	(9,113)	(11,109)
Interest and other expense, net:		
Interest expense, net	(108)	(223)
Other expense, net	(391)	(294)
Total interest and other expense, net	(499)	(517)
Loss before provision for income taxes	(9,612)	(11,626)
Provision for income taxes	155	110
Net loss	$(9,767)	$(11,736)
Net loss per common share:		
Basic and diluted	$(0.18)	$(0.23)
Weighted-average number of shares used to compute net loss per common share:		
Basic and diluted	54,048	51,611
Net loss	$(9,767)	$(11,736)
Other comprehensive income, net of tax:		
Foreign currency translation adjustments, net	266	279
Total other comprehensive income, net of tax	266	279
Comprehensive loss	$(9,501)	$(11,457)

[1] Includes stock-based compensation as follows:

Cost of revenue:		
Systems	$155	$112
Services	99	77
Research and development	1,016	983
Sales and marketing	1,074	850

General and administrative	801	735

See accompanying notes to condensed consolidated financial statements.

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CALIX, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)
(Unaudited)

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Treasury Stock	Total Stockholders' Equity
Balance at December 31, 2018	53,955	$ 1,482	$ 876,073	$ (753)	$ (684,882)	$ (39,986)	$ 151,934
Stock-based compensation	—	—	3,145	—	—	—	3,145
Exercise of stock options	49	1	289	—	—	—	290
Issuance of vested performance restricted stock units and restricted stock units, net of taxes withheld	167	5	(32)	—	—	—	(27)
Stock issued under employee stock purchase plans	(7)	—	—	—	—	—	—
Net loss	—	—	—	—	(9,767)	—	(9,767)
Other comprehensive income	—	—	—	266	—	—	266
Balance at March 30, 2019	54,164	$ 1,488	$ 879,475	$ (487)	$ (694,649)	$ (39,986)	$ 145,841

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Treasury Stock	Total Stockholders' Equity
Balance at December 31, 2017	51,509	$ 1,421	$ 851,054	$ (169)	$ (667,357)	$ (39,986)	$ 144,963
Stock-based compensation	—	—	2,757	—	—	—	2,757
Exercise of stock options	1	—	8	—	—	—	8
Issuance of vested performance restricted stock units and restricted stock units, net of taxes withheld	227	6	(11)	—	—	—	(5)
Stock issued under employee stock purchase plans	(20)	(1)	1	—	—	—	—
Cumulative effect of accounting change	—	—	—	—	1,773	—	1,773
Net loss	—	—	—	—	(11,736)	—	(11,736)
Other comprehensive income	—	—	—	279	—	—	279
Balance at March 31, 2018	51,717	$ 1,426	$ 853,809	$ 110	$ (677,320)	$ (39,986)	$ 138,039

See accompanying notes to condensed consolidated financial statements.

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CALIX, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)
(Unaudited)

	Three Months Ended	
	March 30, 2019	March 31, 2018
Operating activities:		
Net loss	$(9,767)	$(11,736)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	3,145	2,757
Depreciation and amortization	2,281	2,623
Loss on retirement of property and equipment	95	244
Gain on sale of product line	—	(6,704)
Changes in operating assets and liabilities:		
Accounts receivable, net	11,823	25,137
Inventory	2,925	2,451
Prepaid expenses and other assets	(1,935)	(2,521)
Accounts payable	(6,349)	(17,871)
Accrued liabilities	(1,614)	(805)
Deferred revenue	719	866
Other long-term liabilities	(1,696)	(264)
Net cash used in operating activities	(373)	(5,823)
Investing activities:		
Purchases of property and equipment	(5,039)	(1,875)
Proceeds from sale of product line	—	10,350
Net cash provided by (used in) investing activities	(5,039)	8,475
Financing activities:		
Proceeds from exercise of stock options	290	8
Taxes paid for awards vested under equity incentive plan	(27)	(5)
Payments related to financing arrangements	(653)	—
Proceeds from line of credit	30,000	163,238
Repayment of line of credit	(30,000)	(163,238)
Net cash provided by (used in) financing activities	(390)	3
Effect of exchange rate changes on cash, cash equivalents and restricted cash	223	198
Net increase (decrease) in cash, cash equivalents and restricted cash	(5,579)	2,853
Cash, cash equivalents and restricted cash at beginning of period	50,274	39,775
Cash, cash equivalents and restricted cash at end of period	$44,695	$42,628

See accompanying notes to condensed consolidated financial statements.

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CALIX, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

1. Company and Basis of Presentation

Company

Calix, Inc. (together with its subsidiaries, “Calix” or the “Company”) was incorporated in August 1999 and is a Delaware corporation. The Company is a leading global provider of cloud and software platforms, systems and services required to deliver the unified access network and smart home and business services of tomorrow. The Company’s platforms and services help its customers build next generation networks by embracing a DevOps operating model, optimizing the subscriber experience by leveraging big data analytics and turn the complexity of the smart home and business into new revenue streams. The Company's cloud and software platforms, systems and services enable communication service providers (“CSPs”) to provide a wide range of revenue-generating services, from basic voice and data to advanced broadband services, over legacy and next-generation access networks. The Company focuses on CSP access networks, the portion of the network that governs available bandwidth and determines the range and quality of services that can be offered to subscribers.

Basis of Presentation

The accompanying unaudited condensed consolidated financial statements, including the accounts of Calix, Inc. and its wholly-owned subsidiaries, have been prepared in accordance with the requirements of the U.S. Securities and Exchange Commission (“SEC”) for interim reporting. As permitted under those rules, certain footnotes or other financial information that are normally required by U.S. generally accepted accounting principles (“GAAP”) can be condensed or omitted. In the opinion of management, the financial statements include all normal and recurring adjustments that are considered necessary for the fair presentation of the Company’s financial position and operating results. All intercompany balances and transactions have been eliminated in consolidation. The Condensed Consolidated Balance Sheet at December 31, 2018 has been derived from the audited financial statements at that date. The results of the Company’s operations can vary during each quarter of the year. Therefore, the results and trends in these interim financial statements may not be the same as those for the full year or any future periods. The information included in this Quarterly Report on Form 10-Q should be read in conjunction with the audited financial statements included in the Company’s Annual Report on Form 10-K for the year ended December 31, 2018.

The Company’s fiscal year begins on January 1st and ends on December 31st. Quarterly periods are based on a 4-4-5 calendar with the first, second and third quarters ending on the 13th Saturday of each fiscal period. As a result, the Company had one fewer day in the three months ended March 30, 2019 than in the three months ended March 31, 2018. The preparation of financial statements in conformity with GAAP for interim financial reporting requires management to make estimates and assumptions that affect the amounts reported in the condensed consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

2. Significant Accounting Policies

The Company’s significant accounting policies are disclosed in its Annual Report on Form 10-K for the year ended December 31, 2018. The Company’s significant accounting policies did not change during the three months ended March 30, 2019, except for those impacted by the newly adopted accounting standard below.

Newly Adopted Accounting Standard

Leases

In February 2016, the FASB issued Accounting Standards Update No. 2016-02, Leases (Topic 842), which requires recognition of an asset and liability for lease arrangements longer than twelve months. The Company adopted the new standard effective January 1, 2019 using the effective date approach which eliminates the need to restate amounts presented prior to that date. The Company also elected the package of practical expedients but not the hindsight practical expedient. The adoption had a material impact on the Company's Condensed Consolidated Balance Sheets but did not impact the Company's Condensed Consolidated Statements of Comprehensive Loss or Cash Flows. Upon adoption on January 1, 2019, the Company recognized an operating lease right-of-use asset of $15.8 million and a lease liability of $16.7 million.

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Recent Accounting Pronouncements Not Yet Adopted

There have been no recent accounting pronouncements or changes in accounting pronouncements during the three months ended March 30, 2019, as compared to the recent accounting pronouncements described in the Company's Annual Report on Form 10-K for the year ended December 31, 2018, that are of significance or potential significance to the Company.

3. Cash and Cash Equivalents

Cash and cash equivalents consisted of the following (in thousands):

	March 30, 2019	December 31, 2018
Cash and cash equivalents:		
Cash	$ 44,053	$ 45,806
Money market funds	14	3,840
	$ 44,067	$ 49,646

The carrying amounts of the Company's money market funds approximate their fair values due to their nature, duration and short maturities.

4. Balance Sheet Details

Accounts receivable, net consisted of the following (in thousands):

	March 30, 2019	December 31, 2018
Accounts receivable	$ 55,540	$ 67,396
Allowance for doubtful accounts	(338)	(370)
	$ 55,202	$ 67,026

Inventory consisted of the following (in thousands):

	March 30, 2019	December 31, 2018
Raw materials	$ 17,897	$ 10,815
Finished goods	29,329	39,336
	$ 47,226	$ 50,151

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

	March 30, 2019	December 31, 2018
Test equipment	$ 40,220	$ 39,148
Computer equipment and software	36,086	34,697
Furniture and fixtures	2,450	1,976
Leasehold improvements	1,444	3,559
Total	80,200	79,380
Accumulated depreciation and amortization	(53,828)	(54,435)
	$ 26,372	$ 24,945

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Accrued liabilities consisted of the following (in thousands):

	March 30, 2019	December 31, 2018
Compensation and related benefits	$ 21,427	$ 19,811
Warranty and retrofit	8,166	8,547
Customer rebates/prepayments	5,932	6,103
Accrued professional and consulting fees	5,041	6,060
Operating leases	2,196	—
Current portion of equipment financing arrangements	1,715	1,778
Non-income related taxes	1,129	1,288
Freight	1,031	1,187
Insurance	931	917
Excess and obsolete inventory at suppliers	856	2,667
Product return reserve	823	880
Accrued other	6,096	8,631
	$ 55,343	$ 57,869

Warranty and Retrofit

The Company provides a standard warranty for its hardware products. Hardware generally has a one-, three- or five-year standard warranty from the date of shipment. Under certain circumstances, the Company also provides fixes on specifically identified performance failures for products that are outside of the standard warranty period and recognizes estimated costs related to retrofit activities upon identification of such product failures. The Company accrues for potential warranty and retrofit claims based on the Company's historical product failure rates and historical costs incurred in correcting product failures along with other relevant information related to any specifically identified product failures. The Company's warranty and retrofit accruals are based on estimates of losses that are probable based on information available. The adequacy of the accrual is reviewed on a periodic basis and adjusted, if necessary, based on additional information as it becomes available. Changes in the Company's warranty and retrofit reserves in the periods as indicated were as follows (in thousands):

	Three Months Ended	
	March 30, 2019	March 31, 2018
Balance at beginning of period	$8,547	$ 8,708
Provision for warranty and retrofit charged to cost of revenue	706	1,469
Utilization of reserve	(1,087)	(2,080)
Balance at end of period	$8,166	$ 8,097

5. Credit Agreements

Line of Credit

On August 7, 2017, the Company entered into a loan and security agreement (the "Loan Agreement") with Silicon Valley Bank ("SVB"). The Loan Agreement provides for a senior secured revolving credit facility with SVB, pursuant to which SVB agreed to make revolving advances available to the Company in a principal amount of up to $30.0 million based on a customary accounts receivable borrowing base, subject to certain exceptions for accounts originating outside the United States and certain specific accounts, which could reduce the amount available to the Company under the credit facility.

The credit facility includes affirmative and negative covenants applicable to the Company and its subsidiaries. Furthermore, the Loan Agreement requires the Company to maintain a liquidity ratio at minimum levels set forth in more detail in the Loan Agreement. The credit facility also includes events of default, the occurrence and continuation of which would provide SVB with the right to demand immediate repayment of any principal and unpaid interest under the credit facility, and to exercise remedies against the Company and the collateral securing the loans under the credit facility. In February 2019, the Company entered into a third amendment to the Loan Agreement to reduce the required minimum level of the Adjusted Quick Ratio ("AQR") for the first half of 2019 and the required minimum Adjusted EBITDA for the first fiscal quarter of 2019 to accommodate the increased costs and use of cash that the Company anticipates for the first half of 2019 related to activities to mitigate the impact of the U.S. tariffs. As of March 30, 2019, the Company was in compliance with these requirements.

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As of March 30, 2019, the Company had borrowings outstanding of $30.0 million, representing the full amount available under the line of credit. The Company's interest rate on the line of credit was 7.0% as of March 30, 2019 and 6.3% as of March 31, 2018.

Financing Arrangements

During 2018, the Company entered into financing arrangements to purchase lab and test equipment for approximately $5.1 million. Each agreement is to be paid over 36 months with a weighted average interest rate of 6.2%. As of March 30, 2019, there was $4.2 million outstanding under these financing arrangements, which is included in accrued liabilities and other long-term liabilities in the accompanying Condensed Consolidated Balance Sheet.

During 2017 and 2019, the Company entered into financing arrangements for consulting services for up to $4.2 million in connection with the Company's enterprise resource planning ("ERP") implementation. The current amounts due under this agreement are to be paid over a weighted average term of 2.5 years with a weighted average interest rate of 6.9%. As of March 30, 2019, there was $1.3 million outstanding under this arrangement, which is included in accrued liabilities and other long-term liabilities in the accompanying Condensed Consolidated Balance Sheet.

6. Commitments and Contingencies

Lease Commitments

The Company leases office space under non-cancelable operating leases. Certain of the Company's operating leases contain renewal options and rent acceleration clauses. Future minimum payments under the non-cancelable operating leases consisted of the following as of March 30, 2019 (in thousands):

Period	Minimum Future Lease Payments
Remainder of 2019	$ 2,462
2020	3,668
2021	3,447
2022	3,298
2023	3,362
Thereafter	6,100
Total future minimum lease payments	22,337
Less imputed interest	(4,449)
	$ 17,888

Operating lease liability consisted of the following (in thousands):

	March 30, 2019
Accrued liabilities - operating leases	$ 2,196
Operating leases (non-current portion)	15,692
	$ 17,888

The Company leases its headquarters office space in San Jose, California under a lease agreement that expires in December 2025. The future minimum lease payments under the lease are $15.6 million and are included in the table above. The above table also includes future minimum lease payments for the Company's other office facilities, which expire at various dates through 2025.

In August 2018, the Company entered into a new office lease agreement for 22,000 square feet in Petaluma. The lease commenced in February 2019 for a term of 64 months. The future minimum lease payments of $2.7 million are included in the table above. The Company recorded a right-of-use operating lease asset and operating lease liability of $2.2 million in the first quarter 2019. The Company's previous lease in Petaluma, California expired in March 2019. The weighted average discount rate for the Company's operating leases as of March 30, 2019 was 7.0%. The weighted average remaining lease term as of March 30, 2019 was 5.8 years.

For the three months ended March 30, 2019 and March 31, 2018, total rent expense of the Company was $1.2 million and $0.8 million, respectively. Cash paid within operating cash flows for operating leases was $0.8 million for three months ended March 30, 2019.

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Purchase Commitments

The Company's contract manufacturers ("CMs") and original design manufacturers ("ODMs") place orders for certain component inventory in advance based upon the Company's build forecasts in order to reduce manufacturing lead times and ensure adequate component supply. The components are used by the CMs and ODMs to build the products included in the build forecasts. The Company generally does not take ownership of the components held by CMs and ODMs. The Company places purchase orders with its CMs and ODMs in order to fulfill its monthly finished product inventory requirements. The Company incurs a liability when the CMs and ODMs convert the component inventory to a finished product and takes ownership of the inventory when transferred to the designated shipping warehouse. In the event of termination of services with a CM or ODM, the Company has purchased, and may be required to purchase in the future, certain of the remaining components inventory held by the CM or ODM as well as any outstanding orders pursuant to the contractual provisions with such CM or ODM. As of March 30, 2019, the Company had approximately $48.4 million of outstanding purchase commitments for inventories to be delivered by its suppliers, including CMs and ODMs, within one year.

The Company has from time to time, and subject to certain conditions, reimbursed its suppliers for component inventory purchases when this inventory has been rendered excess or obsolete, for example due to manufacturing and engineering change orders resulting from design changes, manufacturing discontinuation of parts by its suppliers, or in cases where inventory levels greatly exceed projected demand. The estimated excess and obsolete inventory liabilities related to such manufacturing and engineering change orders and other factors, which are included in accrued liabilities in the accompanying balance sheets, were $0.9 million and $2.7 million as of March 30, 2019 and December 31, 2018, respectively. The Company records the related charges in cost of systems revenue in its Condensed Consolidated Statements of Comprehensive Loss.

In March 2018, the Company entered into an agreement with a vendor for engineering services pursuant to which the Company will be obligated to make future minimum payments of $15.8 million through 2022.

Litigation

From time to time, the Company is involved in various legal proceedings arising from the normal course of business activities.

The Company is not currently a party to any legal proceedings that, if determined adversely to the Company, in management's opinion, are currently expected to individually or in the aggregate have a material adverse effect on the Company's business, operating results or financial condition taken as a whole.

7. Stockholders' Equity

Equity Incentive Plans

As of March 30, 2019, the Company maintains two equity incentive plans, the 2002 Stock Plan and the 2010 Equity Incentive Award Plan (together, the "Plans"). These plans were approved by the stockholders at the time of adoption and are described in the Company's Annual Report on Form 10-K filed with the SEC on March 1, 2019. Currently, the Company only grants shares from the 2010 Equity Incentive Award Plan. To date, awards granted under the Plans consist of stock options, restricted stock units ("RSUs") and performance restricted stock units ("PRSUs").

Stock Options

During the three months ended March 30, 2019, performance-based stock options exercisable for up to an aggregate of 2.0 million shares of common stock were granted to Company executives with a grant date fair value of $8.03 per share. These performance-based stock option awards contain a one-year performance period and a subsequent three-year service period. The performance targets are based on a combination of the Company's revenue, non-GAAP gross margin, non-GAAP net income per share and other measures during the performance period and are accounted for as performance conditions. After the one-year performance period, if all of the minimum performance targets are met, and subject to certification by the Compensation Committee of the Company's Board of Directors, each performance-based stock option award shall vest with respect to 25% of the earned shares on the certification date and 6.25% of the earned shares on a quarterly basis thereafter, subject to the executive's continuous service with the Company from the grant date through the respective vesting dates. Any performance-based stock options granted under this award that do not meet the respective performance targets will be immediately forfeited and canceled without vesting of any shares.

The probability of meeting the performance conditions related to these performance-based stock option awards was assessed to be unlikely as of March 30, 2019, and therefore no stock-based compensation expense was recognized for the three months ended March 30, 2019.

During the three months ended March 30, 2019, 49 thousand shares of common stock were issued pursuant to the exercise of stock options at a weighted-average exercise price of $5.97 per share. As of March 30, 2019, unrecognized stock-based compensation expense of $4.2 million related to stock options, net of estimated forfeitures, is expected to be recognized over a weighted-average period of 2.9 years.

Restricted Stock Units

During the three months ended March 30, 2019, no RSUs were granted. During the three months ended March 30, 2019, RSUs of 107 thousand vested. As of March 30, 2019, unrecognized stock-based compensation expense of $2.1 million related to RSUs, net of estimated forfeitures, was expected to be recognized over a weighted-average period of 0.8 years.

Performance Restricted Stock Units

During the three months ended March 30, 2019, no PRSUs were granted. During the three months ended March 30, 2019, PRSUs of 63 thousand vested. As of March 30, 2019, all PRSUs have been fully vested and expensed.

Employee Stock Purchase Plans

The Company maintains two employee stock purchase plans - the Amended and Restated Employee Stock Purchase Plan (the “ESPP”) and the Amended and Restated 2017 Nonqualified Employee Stock Purchase Plan (the “Nonqualified ESPP”).

The ESPP allows eligible employees to purchase shares of the Company’s common stock through payroll deductions of up to 15% of their annual compensation subject to certain Internal Revenue Code limitations. In addition, no participant may purchase more than 2,000 shares of common stock in each offering period.

The offering periods under the ESPP are six-month periods commencing on May 15 and November 15 of each year. The price of common stock purchased under the ESPP is 85% of the lower of the fair market value of the common stock on the commencement date and the end date of each six-month offering period. As of March 30, 2019, there were 1.5 million shares available for issuance under the ESPP. As of March 30, 2019, unrecognized stock-based compensation expense of $0.2 million related to the ESPP is expected to be recognized over a remaining service period of 0.1 years.

The Nonqualified ESPP allows eligible employees to purchase shares of the Company’s common stock through payroll deductions of up to 25% of their annual compensation. Eligible employees have the right to (a) purchase the maximum number of whole shares of common stock that can be purchased with the elected payroll deductions during each offering period for which the employee is enrolled at a purchase price equal to the closing price of the Company’s common stock on the last day of such offering period and (b) receive an equal number of shares of the Company’s common stock that are subject to a risk of forfeiture in the event the employee terminates employment within the one year period immediately following the purchase date. The Nonqualified ESPP provides two six-month offering periods, currently from December 21 through June 20 and June 21 through December 20 of each year. At the annual meeting of stockholders of the Company on May 16, 2018, the stockholders approved an amendment of certain terms and an increase in the number of shares of common stock issuable under the Nonqualified ESPP by 2.5 million shares. The maximum number of shares of common stock currently authorized for issuance under the Nonqualified ESPP is 3.5 million shares, with a maximum of 0.5 million shares allocated per purchase period. During the three months ended March 30, 2019, no shares were purchased and issued. As of March 30, 2019, there were 2.8 million shares available for issuance under the Nonqualified ESPP. As of March 30, 2019, unrecognized stock-based compensation expense of $2.5 million related to the Nonqualified ESPP is expected to be recognized over a remaining weighted-average service period of 1.0 years.

8. Revenue from Contracts with Customers

The Company derives revenue from contracts with customers primarily from the following and categorizes its revenue as follows:

- Systems include revenue from the sale of access and premises systems, software platform licenses and cloud-based software subscriptions.
- Services include revenue from professional services, customer support, software- and cloud-based maintenance, extended warranty subscriptions, training and managed services.

The following is a summary of revenue disaggregated by geographic region based upon the location of the customers (in thousands):

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	Three Months Ended	
	March 30, 2019	March 31, 2018
United States	$75,785	$89,389
Middle East	3,751	3,151
Canada	3,415	2,286
Europe	2,439	1,227
Caribbean	2,266	1,137
Other	1,694	2,213
	$89,350	$99,403

Contract Asset

The primary contract asset is revenue recognized on professional services contracts where the services are transferred to the customer over time, less any progress billings and advanced payments, and is classified within accounts receivable. Amounts are billed in accordance with the agreed-upon contractual terms. The balance at December 31, 2018 was $5.9 million of which $2.9 million remained in the Company's Condensed Consolidated Balance Sheet at March 30, 2019. The closing balance at March 30, 2019 was $3.9 million of which the Company expects to bill substantially all of the balance during 2019. The increase in the contract asset was driven by the timing of professional services contracts with a major customer at the end of 2018.

Contract Liability

Deferred revenue consisted of the following (in thousands):

	March 30, 2019	December 31, 2018
Current:		
Products and services	$ 11,482	$ 11,600
Extended warranty	4,082	4,000
	15,564	15,600
Long-term:		
Products and services	638	440
Extended warranty	17,614	17,056
	18,252	17,496
	$ 33,816	$ 33,096

The increase in the deferred revenue balance for the three months ended March 30, 2019 is primarily driven by cash payments received or due in advance of satisfying the Company's performance obligations, offset by $5.8 million of revenue recognized that was included in the deferred revenue balance at the beginning of the period.

The Company expects to recognize 46% of such revenue over the next 12 months and the remainder thereafter.

Contract Costs

The Company capitalizes certain sales commissions related primarily to extended warranty and Calix Cloud products for which the expected amortization period is greater than one year. As of March 30, 2019, the unamortized balance of deferred commissions was $0.7 million. For the three months ended March 30, 2019, the amount of amortization was less than $0.1 million, and there was no impairment loss in relation to the costs capitalized.

Concentration of Customer Risk

The Company had one customer that accounted for more than 10% of its total revenue for the three months ended March 30, 2019 and March 31, 2018. The one customer represented 14% of the Company’s total revenue for both the three months ended March 30, 2019 and March 31, 2018. That one customer also represented more than 10% of the Company’s accounts receivable as of December 31, 2018. As of March 30, 2019, another customer represented more than 10% of the Company’s accounts receivable.

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9. Income Taxes

The following table presents the provision for income taxes from continuing operations and the effective tax rates for the periods indicated (in thousands, except percentages):

	Three Months Ended	
	March 30, 2019	March 31, 2018
Provision for income taxes	$155	$ 110
Effective tax rate	(1.6)%	(0.9)%

The effective tax rate for the three months ended March 30, 2019 was determined using an estimated annual effective tax rate adjusted for discrete items, if any, that occurred during the respective periods.

Deferred tax assets are recognized if realization of such assets is more likely than not. The Company has established and continues to maintain a full valuation allowance against its net deferred tax assets, with the exception of certain foreign deferred tax assets, as the Company does not believe that realization of those assets is more likely than not.

The Company’s effective tax rate may be subject to fluctuation during the year as new information is obtained, which may affect the assumptions used to estimate the annual effective tax rate, including factors such as the mix of forecasted pre-tax earnings in the various jurisdictions in which it operates, valuation allowances against deferred tax assets, the recognition or de-recognition of tax benefits related to uncertain tax positions, and changes in or the interpretation of tax laws in jurisdictions where it conducts business.

10. Net Loss Per Common Share

The following table sets forth the computation of basic and diluted net loss per common share for the periods indicated (in thousands, except per share data):

	Three Months Ended	
	March 30, 2019	March 31, 2018
Numerator:		
Net loss	$(9,767)	$(11,736)
Denominator:		
Weighted-average common shares outstanding used to compute basic and diluted net loss per share	54,048	51,611
Basic and diluted net loss per common share	$(0.18)	$(0.23)
Potentially dilutive shares, weighted average	6,221	6,870

Potentially dilutive shares have been excluded from the computation of diluted net loss per common share when their effect is antidilutive. These antidilutive shares were primarily from stock options, restricted stock units and performance restricted stock units. For each of the periods presented where the Company reported a net loss, the effect of all potentially dilutive securities would be antidilutive, and as a result diluted net loss per common share is the same as basic net loss per common share.

ITEM 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations

This report includes “forward-looking statements” within the meaning of Section 27A of the Securities Act and Section 21E of the Securities and Exchange Act of 1934, as amended. All statements other than statements of historical facts are “forward-looking statements” for purposes of these provisions, including any projections of earnings, revenue or other financial items, any statement of or concerning the following: the plans and objectives of management for future operations, proposed new products or licensing, product development, anticipated customer demand or capital expenditures, future economic and/or market conditions or performance and assumptions underlying any of the above. In some cases, forward-looking statements can be identified by the use of terminology such as “may,” “will,” “expects,” “believes,” “intends,” “plans,” “anticipates,” “estimates,” “projects,” “potential,” or “continu negative thereof or other comparable terminology. Although we believe that the expectations reflected in the forward-looking statements contained herein are reasonable, there can be no assurance that such expectations or any of the forward-looking statements will prove to be correct, and actual results could differ materially from those projected or assumed in the forward-looking statements. Our future financial condition and results of operations, as well as any forward-looking statements, are subject to inherent risks and uncertainties, including those identified in the Risk Factors discussed in Part II, Item 1A, in the discussion below, as well as in other sections of this report and in our Annual Report on Form 10-K for the year ended December 31, 2018. All forward-looking statements and reasons why results may differ included in this Quarterly Report on Form 10-Q are made as of the date hereof, and we assume no obligation to update these forward-looking statements or reasons why actual results might differ.

Overview

We are a leading global provider of cloud and software platforms, systems and services for fiber- and copper-based network architectures and a pioneer in software defined access and cloud products focused on access networks and the subscriber. Our portfolio allows for a broad range of subscriber services to be provisioned and delivered over a single unified network. Our access systems can deliver voice and data services, advanced broadband services, mobile broadband, as well as high-definition video and online gaming. Our most recent generation of premises systems enable CSPs to address the complexity of the smart home and business and offer new services to their device enabled subscribers. We have designed all of our current platforms and related systems so that they can be monitored, analyzed, managed and supported by Calix Cloud.

We market our cloud and software platforms, systems and services to CSPs globally through our direct sales force as well as select resellers. Our customers range from smaller, regional CSPs to some of the world's largest CSPs. We have enabled over 1,500 customers to deploy passive optical, Active Ethernet and point-to-point Ethernet fiber access networks.

In the third quarter of 2018, the United States enacted tariffs on certain goods manufactured in China and proposed increasing the tariffs to 25% initially commencing in January 2019 and subsequently deferred the increase in tariffs pending trade negotiations between the United States and China. We incurred U.S. tariff and tariff-related costs of $3.2 million in the fourth quarter of 2018 and $2.2 million in the first quarter of 2019. In order to mitigate the impact of these tariffs, we undertook a broad plan to realign our global supply chain by moving substantially all of our production outside of China in addition to other supply chain improvements. In the first quarter of 2019, we transitioned substantially all of our product supply out of China. As a result, we expect U.S. tariff and tariff-related costs to decrease in the second and third quarters of 2019, however, the costs associated with realigning our supply chain will continue through this period.

Our revenue was $89.4 million for the three months ended March 30, 2019, compared to $99.4 million for the three months ended March 31, 2018. The $10.1 million decrease in revenue was primarily due to product shortages related to production delays associated with our global supply chain realignment efforts. Our revenue and potential revenue growth will depend on our ability to quickly resolve these supply chain challenges and ensure our supply chain operations are able to meet our product supply needs. Our revenue and potential revenue growth will also depend on our ability to sell and license our cloud and software platforms, systems and services to existing customers as well as our ability to attract new customers, particularly larger CSPs, in the United States and internationally.

Revenue fluctuations result from many factors, including, but not limited to: increases or decreases in customer orders for our products and services, market, financial or other factors that may delay or materially impact customer purchasing decisions, non-availability of products due to supply chain challenges, contractual terms with customers that result in delayed revenue recognition and varying budget cycles and seasonal buying patterns of our customers. More specifically, our customers tend to spend less in the first quarter as they are finalizing their annual budgets, and in certain regions, customers are challenged by winter weather conditions that inhibit fiber deployment in outside infrastructure. Our revenue is also dependent upon our customers' timing of purchases, capital expenditure plans and decisions to upgrade their network or adopt new technologies, including expenditure plans for turnkey solutions projects, which are generally non-recurring in nature.

Cost of revenue is strongly correlated to revenue and tends to fluctuate due to all of the above factors that may cause revenue fluctuations. Factors that impacted our cost of revenue for the three months ended March 30, 2019, and that we expect will impact cost of revenue in future periods, also include: changes in the mix of products delivered, customer location and regional mix, changes in product warranty and incurrence of retrofit costs, changes in the cost of our inventory, including higher costs due to materials shortages, supply constraints or unfavorable changes in trade policies, tariffs and associated costs to mitigate the impact of tariffs, and inventory write-downs. Cost of revenue also includes fixed expenses related to our internal operations, which could impact our cost of revenue as a percentage of

revenue if there are large fluctuations in revenue.
Our gross profit and gross margin fluctuate based on timing of factors such as new product introductions or upgrades to existing products, changes in customer mix and changes in the mix of products demanded and sold (and any related write-downs of existing inventory) and may be negatively impacted by increases in mix of revenue towards professional services, increases in mix of revenue from channel sales rather than direct sales or other unfavorable customer or product mix, shipment volumes and any related volume discounts, changes in our product and services costs, pricing decreases or discounts, customer rebates and incentive programs due to competitive pressure or materials shortages, supply constraints, tariffs or unfavorable changes in trade policies.
Our operating expenses fluctuate based on the following factors: changes in headcount and personnel costs, which comprise a significant portion of our operating expenses; variable compensation due to fluctuations in shipment volumes or meeting

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financial performance metrics; timing of research and development expenses, including investments in innovative solutions and new customer segments, prototype builds and outsourced development projects; investments in our business and information technology infrastructure, including our investments to migrate our ERP system; and fluctuations in stock-based compensation expenses due to timing of equity grants or other factors affecting vesting.

For the three months ended March 30, 2019 as compared with the corresponding period in 2018, our total operating expenses decreased by $5.7 million largely due to restructuring actions we took in 2017 and early 2018. These restructuring actions were completed in the second quarter of 2018.

Our net loss was $9.8 million for the three months ended March 30, 2019, compared to a net loss of $11.7 million for the three months ended March 31, 2018. Since our inception we have incurred significant losses, and as of March 30, 2019, we had an accumulated deficit of $694.6 million. Further, as a result of factors contributing to the fluctuations described above among other factors, many of which are outside our control, our quarterly operating results fluctuate from period to period. Comparing our operating results on a period-to-period basis may not be meaningful, and you should not rely on our past results as an indication of our future performance.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with U.S. GAAP. These accounting principles require us to make certain estimates and judgments that can affect the reported amounts of assets and liabilities as of the date of the financial statements, as well as the reported amounts of revenue and expenses during the periods presented. Management bases its estimates, assumptions and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances. To the extent there are material differences between these estimates and actual results, our financial statements may be affected. Our management evaluates its estimates, assumptions and judgments on an ongoing basis.

Our critical accounting policies and estimates are described under “Critical Accounting Policies and Estimates” in “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in our Annual Report on Form 10-K for the year ended December 31, 2018. For the three months ended March 30, 2019, there have been no significant changes in our critical accounting policies and estimates.

Recent Accounting Pronouncements

See Note 2 to the unaudited condensed consolidated financial statements set forth in Part I, Item 1 of this Quarterly Report on Form 10-Q for a full description of recent accounting pronouncements, including the expected dates of adoption and estimated effects on results of operations and financial condition, which is incorporated herein by reference.

Results of Operations

Comparison of the Three Months Ended March 30, 2019 and March 31, 2018

Revenue

Our revenue is comprised of the following:

- Systems include revenue from the sale of access and premises systems, software platform licenses and cloud-based software subscriptions.
- Services include revenue from professional services, customer support, software- and cloud-based maintenance, extended warranty subscriptions, training and managed services.

The following table sets forth our revenue (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Revenue:				
Systems	$82,360	$93,291	$(10,931)	(12)%
Services	6,990	6,112	878	14 %
	$89,350	$99,403	$(10,053)	(10)%

Percent of total revenue:

Systems	92 %	94 %
Services	8 %	6 %
	100 %	100 %

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Our revenue decreased by $10.1 million, or 10%, for the three months ended March 30, 2019, as compared to the corresponding period in 2018 due to lower systems revenue of $10.9 million offset by higher services revenue of $0.9 million. The decline in systems revenue was primarily due to product shortages due to production challenges and delays associated with our global supply chain realignment efforts. The increase in services revenue was primarily due to increases in support services revenue. We currently expect production and product availability to improve in the second quarter and we have targeted resources to prioritize our efforts to meet current planned customer requirements. However, if we are not able to resolve the supply chain challenges to ensure adequate product availability to meet customer needs, our revenue would be further negatively impacted.

For the three months ended March 30, 2019, revenue generated in the United States was $75.8 million, or 85% of our total revenue, compared to $89.4 million, or 90% of our total revenue, for the same period in 2018. International revenue was $13.6 million, or 15% of our total revenue, for the three months ended March 30, 2019, as compared to $10.0 million, or 10% of our total revenue, for the same period in 2018.

We had one customer that accounted for more than 10% of our total revenue for the first quarter of 2019 and 2018. See Note 8 to the unaudited condensed consolidated financial statements set forth in Part I, Item 1 of this Quarterly Report on Form 10-Q for more details on concentration of revenue for the periods presented.

Cost of Revenue, Gross Profit and Gross Margin

The following table sets forth our cost of revenue (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Cost of revenue:				
Systems	$44,601	$ 51,633	$(7,032)	(14)%
Services	6,406	5,711	695	12 %
	$51,007	$ 57,344	$(6,337)	(11)%

Our cost of revenue decreased by $6.3 million for the three months ended March 30, 2019, as compared with the corresponding period in 2018. This was primarily attributable to lower systems revenue for the three months ended March 30, 2019, as compared with the corresponding period in 2018, mainly due to the product shortages described above, partially offset by U.S. tariffs and tariff-related costs of $2.2 million in the first quarter of 2019.

The following table sets forth our gross profit and gross margin (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Gross profit:				
Systems	$37,759	$41,658	$(3,899)	(9)%
Services	584	401	183	46 %
	$38,343	$42,059	$(3,716)	(9)%
Gross margin:				
Systems	45.8 %	44.7 %		
Services	8.4 %	6.6 %		
Overall	42.9 %	42.3 %		

Gross profit decreased to $38.3 million for the three months ended March 30, 2019, from $42.1 million during the corresponding period in 2018 due to lower sales. Gross margin remained relatively consistent for the three months ended March 30, 2019 compared to the corresponding period in 2018. During the first quarter of 2019, systems gross margin was negatively impacted by U.S. tariff and tariff-related costs of $2.2 million, or 260 basis points. Excluding the impact of U.S. tariff and tariff-related costs, systems gross margin was 48.5%. The increase in systems gross margin compared to the year ago period is primarily due to an increasing mix of new systems that have higher gross margin than some of our older traditional systems. Services gross margin for the first quarter of 2019 increased 180 basis points from the year ago period primarily from an increase in mix toward higher margin support services, partially offset by investments in customer success and support personnel to support the expansion of our cloud and customer support offerings.

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Operating Expenses

Research and Development Expenses

The following table sets forth our research and development expenses (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Research and development	$19,330	$25,536	$(6,206)	(24)%
Percent of total revenue	22 %	26 %		

The decrease in research and development expenses by $6.2 million for the three months ended March 30, 2019 as compared with the corresponding period in 2018 was primarily due to the leverage of our software platforms enabling us to lower our level of investment and introduce new products faster. During 2017 and the first quarter of 2018, we restructured our business to increase our focus towards investments in these software platforms and to reduce the expense structure in our traditional systems business. As a result, our research and development personnel decreased in the first quarter of 2019 as compared to the corresponding period in 2018, which resulted in lower compensation and employee benefits of $4.7 million. The decrease was also due to lower expenses for outside services of $1.3 million and lower expenditures relating to prototype and expendable equipment of $0.2 million.

Sales and Marketing Expenses

The following table sets forth our sales and marketing expenses (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Sales and marketing	$19,339	$19,901	$ (562)	(3)%
Percent of total revenue	22 %	20 %		

Sales and marketing expenses for the three months ended March 30, 2019 decreased by $0.6 million compared with the corresponding period in 2018 primarily due to lower personnel costs of $0.7 million, including commissions.

General and Administrative Expenses

The following table sets forth our general and administrative expenses (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
General and administrative	$8,787	$9,095	$ (308)	(3)%
Percent of total revenue	10 %	9 %		

General and administrative expenses for the three months ended March 30, 2019 decreased by $0.3 million compared with the corresponding period in 2018 mainly due to a decrease in professional services. This was largely a result of our adoption of a new accounting standard in the fourth quarter of 2018, which allows us to capitalize certain implementation costs related to our project to migrate our on-premise ERP system to a cloud model. We expect to go live with our cloud system in the later part of 2019 at which point we will begin amortizing the capitalized implementation costs.

Gain on Sale of Product Line

In the first quarter of 2018, we recognized a gain of $6.7 million relating to the sale of our outdoor cabinet product line to Clearfield, Inc. for $10.4 million.

Restructuring Charges

We incurred restructuring charges of $5.3 million for the three months ended March 31, 2018, consisting primarily of severance and other termination related benefits.

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Provision for Income Taxes

The following table sets forth our provision for income taxes (dollars in thousands):

	Three Months Ended			
	March 30, 2019	March 31, 2018	Variance in Dollars	Variance in Percent
Provision for income taxes	$ 155	$ 110	$ 45	41 %
Effective tax rate	(1.6)%	(0.9)%		

The effective tax rate for the three months ended March 30, 2019 was determined using an estimated annual effective tax rate adjusted for discrete items, if any, that occurred during the respective periods.

Deferred tax assets are recognized if realization of such assets is more likely than not. We have established and continue to maintain a full valuation allowance against our net deferred tax assets, with the exception of certain foreign deferred tax assets, as we do not believe that realization of those assets is more likely than not.

Our effective tax rate may be subject to fluctuation during the year as new information is obtained, which may affect the assumptions used to estimate the annual effective tax rate, including factors such as the mix of forecasted pre-tax earnings in the various jurisdictions in which we operate, valuation allowances against deferred tax assets, the recognition or de-recognition of tax benefits related to uncertain tax positions, and changes in or the interpretation of tax laws in jurisdictions where we conduct business.

Liquidity and Capital Resources

We have funded our operations and investing activities primarily through cash generated from operations, borrowings on our line of credit, equipment financing arrangements for financing certain lab equipment and sales of our common stock. As of March 30, 2019, we had cash and cash equivalents of $44.1 million, which consisted of deposits held at banks and money market mutual funds held at major financial institutions.

Operating Activities

Net cash used in operating activities was $0.4 million for the three months ended March 30, 2019 and consisted of a net loss of $9.8 million partially offset by $3.9 million of cash flow increases reflected in the net change in assets and liabilities and by $5.5 million of non-cash charges. Cash flow increases resulting from the net change in assets and liabilities primarily consisted of a decrease in accounts receivable of $11.8 million, mainly due to lower sales, a decrease in inventory of $2.9 million, primarily due to unavailability of finished goods from our supply chain partners, and an increase in deferred revenue of $0.7 million due to increased sales of license subscriptions and related support. This was partially offset by a decrease in accounts payable of $6.3 million, primarily due to a commensurate decline in cost of revenue, an increase in prepaid expenses and other assets of $1.9 million, mainly due to inventory sold to a CM and not yet paid, a decrease in other long-term liabilities of $1.7 million, mainly due to the amortization of operating lease liabilities, and a decrease in accrued liabilities of $1.6 million, mainly related to a decrease in accrued professional and consulting fees and a decrease in accrued business events. Non-cash charges primarily consisted of stock-based compensation of $3.1 million and depreciation and amortization of $2.3 million.

During the three months ended March 31, 2018, net cash used in operating activities was $5.8 million and consisted of a net loss of $11.1 million, partially offset by $7.0 million of cash flow increases reflected in the net change in assets and liabilities and $1.1 million of non-cash charges. Cash flow increases resulting from the net change in assets and liabilities primarily consisted of a decrease in accounts receivable of $25.1 million mainly due to collection from one of our key customers that delayed payment from year end to early January 2018 and a decrease in inventory of $2.5 million primarily due to the timing of inventory receipts from our manufacturers. This was partially offset by a decrease in accounts payable of $17.9 million primarily due to a commensurate decline in cost of revenue and an increase in prepaid expenses and other assets of $2.5 million mainly due to prepayment for software as a service tools and deposits with vendors. Non-cash charges primarily consisted of stock-based compensation of $2.8 million, depreciation and amortization of $2.6 million and gain on sale of product line of $6.7 million.

Investing Activities

Net cash used in investing activities of $5.0 million for the three months ended March 30, 2019 consisted of capital expenditures primarily for purchases of test equipment, computer equipment and software, including capitalized costs associated with our ERP system migration.

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Net cash provided by investing activities of $8.5 million for the three months ended March 31, 2018 consisted of cash proceeds of $10.4 million from the sale of our outdoor cabinet product line partially offset by capital expenditures of $1.9 million for purchases of test equipment, computer equipment and software.

Financing Activities

Net cash used in financing activities of $0.4 million for the three months ended March 30, 2019 mainly consisted of $0.7 million of payments for financing arrangements partially offset by proceeds from the issuance of common stock from stock option exercises.

Net cash provided by financing activities was de minimis for the three months ended March 31, 2018.

Financing activities in both periods included our borrowings and repayments under our $30.0 million line of credit pursuant to our Loan Agreement with SVB.

Working Capital and Capital Expenditure Needs

Our material cash commitments include contractual obligations under our Loan Agreement, normal recurring trade payables, compensation-related and expense accruals, operating leases and non-cancelable firm purchase commitments. We believe that our outsourced approach to manufacturing provides us significant flexibility in both managing inventory levels and financing our inventory. In the event that our revenue plan does not meet our expectations, we may be required to eliminate or curtail expenditures to mitigate the impact on our working capital.

In August 2017, we entered into the Loan Agreement for a senior secured revolving credit facility with SVB, which provides for a revolving credit facility of up to $30.0 million based on a customary accounts receivable borrowing base, subject to certain exceptions for accounts originating outside the United States and certain specific accounts, which could reduce the amount available to us under the credit facility. The Loan Agreement includes affirmative and negative covenants and requires us to maintain a liquidity ratio at minimum levels specified in the Loan Agreement. For the month ended November 30, 2017, we were not able to maintain the minimum Adjusted Quick Ratio, or AQR (as defined in the Loan Agreement, as amended) at the level required in the Loan Agreement, which constituted an event of default. Although SVB waived this event of default effective as of November 30, 2017 and, therefore, this default did not change our ability to borrow under the Loan Agreement, we were required to amend certain covenants under the Loan Agreement.

In February 2018, we entered into an amendment to the Loan Agreement that, among other things, amended certain affirmative financial covenants, including reductions to the required minimum level of the AQR and the inclusion of an additional financial covenant related to the maintenance of Adjusted EBITDA (as defined in the Loan Agreement, as amended). In August 2018, we entered into a second amendment to the Loan Agreement that, among other things, extended the maturity date from August 7, 2019 to August 7, 2020, amended certain financial covenants, including covenants with respect to the AQR and Adjusted EBITDA, and changed the compliance requirements for the AQR covenant from a monthly basis to a quarterly basis. In February 2019, we entered into a third amendment to the Loan Agreement to reduce the required minimum level of the AQR for the first half of 2019 and the required minimum Adjusted EBITDA for the first fiscal quarter of 2019 to accommodate the increased costs and use of cash that we anticipate for the first half of 2019 related to activities to mitigate the impact of the U.S. tariffs. As of March 30, 2019, we were in compliance with these covenants. Although we were compliant with the financial covenants under the Loan Agreement as of March 30, 2019, given our current financial position and history of operating losses, it is possible that we may fail to meet the minimum levels required by the financial covenants in a future period. In particular, if we are unable to generate positive cash flows on a continued basis, we could fall below the minimum AQR requirement, and if we are unable to achieve and maintain profitability, we may not be able to meet our Adjusted EBITDA requirement, each of which would constitute an event of default under the Loan Agreement.

As of March 30, 2019, we borrowed the full principal amount under this line of credit of $30.0 million. Please refer to Note 5, “Credit Agreements” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q for more details on this credit facility.

During 2018, we entered into financing arrangements to purchase research and development equipment for approximately $5.1 million. Each agreement is to be paid over 36 months with a weighted average interest rate of 6.2%. As of March 30, 2019, we had $4.2 million outstanding under these financing arrangements.

During 2017 and 2019, in connection with the Company’s ERP implementation, the cloud vendor agreed to finance the consulting services up to $4.2 million. The current amounts due under this agreement are to be paid over a weighted average term of 2.5 years with a weighted average interest rate of 6.9%. As of March 30, 2019, there was $1.3 million outstanding under this arrangement, which is included in accrued liabilities and other long-term liabilities in the accompanying Condensed Consolidated Balance Sheet.

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We believe, based on our current operating plan and expected operating cash flows, that our existing cash and cash equivalents, along with future available borrowings under our SVB line of credit, will be sufficient to meet our anticipated cash needs for at least the next twelve months. We expect to continue to draw on the SVB line of credit from time to time to support our working capital needs. Our future capital requirements will depend on many factors including our rate of revenue growth; timing of customer payments and payment terms, particularly of larger customers; the timing and extent of spending to support development efforts, particularly research and development related to growth initiatives such as our software defined access portfolio, and our ability to partner with third parties to outsource our research and development projects; our ability to manage product cost, including the cost impact of the current U.S. tariffs as well as our ability to mitigate the cost impact through supply chain re-engineering as currently planned, the possibility of additional tariffs that may impact our product costs and higher component costs associated with new technologies; our ability to implement efficiencies and maintain product margin levels; the expansion of sales and marketing activities; the timing of introductions and customer adoption of new products and enhancements to existing products; the slowdowns or declines in customer purchases of traditional systems; acquisition of new capabilities or technologies; and the continued market acceptance of our products. If we are unable to execute on our current operating plan or generate positive operating income and positive cash flows, our liquidity, results of operations and financial condition will be adversely affected and we may fail to comply with the covenants in the Loan Agreement, in which case we may not be able to borrow under the SVB line of credit. In particular, although we have moved substantially all of our production out of China to avoid incurrence of U.S. tariffs, we continue to incur costs for our supply chain re-engineering. Furthermore, re-engineering of our supply chain to mitigate the impact of the tariffs requires significant effort and we have experienced significant production challenges resulting in product shortages that have negatively impacted our revenues, results of operations and cash flows. We are heavily dependent upon third party supply partners for our supply chain operations, and we may not be able to resolve these production challenges as quickly as desired and may incur higher costs than initially planned associated with these efforts. Moreover, there remains uncertainty as to the scope of the tariffs and whether additional tariffs or other measures may be imposed that could have further cost impact to us. We may need to seek other sources of liquidity, including the sale of equity or incremental borrowings, to support our working capital needs. In addition, we may choose to seek other sources of liquidity even if we believe we have generated sufficient cash flows to support our operational needs. There is no assurance that any other sources of liquidity may be available to us on acceptable terms or at all. If we are unable to generate sufficient cash flows or obtain other sources of liquidity, we will be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, all of which may adversely impact our business and potential growth.

Contractual Obligations and Commitments

Our principal commitments as of March 30, 2019 consisted of our contractual obligations under the Loan Agreement, equipment financing arrangements, operating leases for office space and non-cancelable outstanding purchase obligations. The following table summarizes our contractual obligations at March 30, 2019 (in thousands):

	Payments Due by Period				
	Total	Less Than 1 Year	1-3 Years	3-5 Years	More Than 5 Years
Line of credit, including interest (1)	$32,854	$2,106	$30,748	$—	$—
Financing arrangements (2)	5,893	2,646	3,247	—	—
Operating lease obligations (3)	22,337	3,385	7,038	6,737	5,177
Non-cancelable purchase commitments (4)	64,176	48,362	8,390	7,424	—
	$125,260	$56,499	$49,423	$14,161	$5,177

(1) Line of credit contractual obligations include projected interest payments over the term of the Loan Agreement, assuming interest rate in effect for the outstanding borrowings as of March 30, 2019 of 7% and payment of the borrowings on August 7, 2020, the contractual maturity date of the credit facility. See Note 5, “Credit Agreements” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q for further discussion regarding our contractual obligations relating to our line of credit.

(2) Represents installment payments, including interest, for financing arrangements. See Note 5, “Credit Agreements” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q for further discussion regarding our outstanding purchase commitments.
(3) Future minimum operating lease obligations in the table above include primarily payments for our office locations, which expire at various dates through 2025. See Note 6, “Commitments and Contingencies” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q for further discussion regarding our operating leases.

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(4) Represents outstanding purchase commitments for inventory and services to be delivered by our suppliers, including CMs, original design manufacturers (“ODMs”) and engineering service providers. See Note 6, “Commitments and Contingencies” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q for further discussion regarding our outstanding purchase commitments.

Off-Balance Sheet Arrangements

As of March 30, 2019 and December 31, 2018, we did not have any off-balance sheet arrangements.

ITEM 3. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate Risk

The primary objectives of our investment activity are to preserve principal, provide liquidity and maximize income without significantly increasing risk. By policy, we do not enter into investments for trading or speculative purposes. At March 30, 2019, we had cash and cash equivalents of $44.1 million, which were held primarily in cash and money market funds. Due to the nature of these money market funds, we believe that we do not have any material exposure to changes in the fair value of our cash equivalents as a result of changes in interest rates.

Our exposure to interest rate risk also relates to the amount of interest we must pay on our borrowings under our revolving credit facility pursuant to our Loan Agreement with SVB. Borrowings under the Loan Agreement will bear interest through maturity at a variable annual rate based upon an annual rate of either a prime rate or a LIBOR rate, plus an applicable margin between 0.5% to 1.5% for prime rate advances and between 2.0% and 3.0% for LIBOR advances based on the Company’s maintenance of an applicable liquidity ratio. As of March 30, 2019, we had $30.0 million outstanding in borrowings under the Loan Agreement.

Foreign Currency Exchange Risk

Our primary foreign currency exposures are described below.

Economic Exposure

The direct effect of foreign currency fluctuations on our sales and expenses has not been material because our sales and expenses are primarily denominated in U.S. dollars (“USD”). However, we are indirectly exposed to changes in foreign currency exchange rates to the extent of our use of foreign contract manufacturers whom we pay in USD. Increases in the local currency rates of these vendors in relation to USD could cause an increase in the price of products that we purchase. Additionally, if the USD strengthens relative to other currencies, such strengthening could have an indirect effect on our sales to the extent it raises the cost of our products to non-U.S. customers and thereby reduces demand. A weaker USD could have the opposite effect. The precise indirect effect of currency fluctuations is difficult to measure or predict because our sales are influenced by many factors in addition to the impact of such currency fluctuations.

Translation Exposure

Our sales contracts are primarily denominated in USD and, therefore, the majority of our revenue is not subject to foreign currency risk. We are directly exposed to changes in foreign exchange rates to the extent such changes affect our expenses related to our foreign assets and liabilities with our active subsidiaries in China and the United Kingdom, whose functional currencies are Chinese Renminbi (“RMB”) and British Pounds Sterling (“GBP”).

Our operating expenses are incurred primarily in the United States, in China associated with our research and development operations that are maintained there and in the United Kingdom for our international sales and marketing activities. Our operating expenses are generally denominated in the functional currencies of our subsidiaries in which the operations are located. The percentages of our operating expenses denominated in the following currencies for the indicated periods were as follows:

	Three Months Ended			
	March 30, 2019		March 31, 2018	
USD	90	%	89	%
RMB	7	%	8	%
GBP	3	%	3	%
	100	%	100	%

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If USD had appreciated or depreciated by 10%, relative to RMB and GBP, our operating expenses for the first three months of 2019 would have decreased or increased by approximately $0.5 million, or approximately 1%. We do not currently enter into forward exchange contracts to hedge exposure denominated in foreign currencies or any derivative financial instruments. In the future, we may consider entering into hedging transactions to help mitigate our foreign currency exchange risk.

Foreign exchange rate fluctuations may also adversely impact our financial position as the assets and liabilities of our foreign operations are translated into USD in preparing our Condensed Consolidated Balance Sheets. The effect of foreign exchange rate fluctuations on our consolidated financial position for the three months ended March 30, 2019 was a net translation gain of approximately $0.3 million. This gain is recognized as an adjustment to stockholders' equity through accumulated other comprehensive loss.

Transaction Exposure

We have certain assets and liabilities, primarily receivables and accounts payable (including inter-company transactions) that are denominated in currencies other than the relevant entity's functional currency. In certain circumstances, changes in the functional currency value of these assets and liabilities create fluctuations in our reported consolidated financial position, cash flows and results of operations. Transaction gains and losses on these foreign currency denominated assets and liabilities are recognized each period within "Other expense, net" in our Condensed Consolidated Statements of Comprehensive Loss. During the three months ended March 30, 2019, the net loss we recognized related to these foreign exchange assets and liabilities was approximately $0.3 million.

ITEM 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Based on their evaluation as of March 30, 2019, our Chief Executive Officer and Chief Financial Officer, with the participation of our management, have concluded that our disclosure controls and procedures (as defined in Rules 13a–15(e) and 15d–15(e) under the Exchange Act) were effective at the reasonable assurance level.

Limitations on the Effectiveness of Controls

Our disclosure controls and procedures provide our Chief Executive Officer and Chief Financial Officer reasonable assurance that our disclosure controls and procedures will achieve their objectives. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate, to allow timely decisions regarding required disclosure. Our management, including our Chief Executive Officer and Chief Financial Officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting can or will prevent all human error. Our management recognizes that a control system, no matter how well designed and implemented, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Furthermore, the design of a control system must reflect the fact that there are internal resource constraints, and the benefit of controls must be weighed relative to their corresponding costs. Because of the limitations in all control systems, no evaluation of controls can provide complete assurance that all control issues and instances of error, if any, within our company are detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur due to human error or mistake. Additionally, controls, no matter how well designed, could be circumvented by the individual acts of specific persons within the organization. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated objectives under all potential future conditions.

Changes in Internal Control over Financial Reporting

During the first quarter of 2019, we implemented internal controls for the new lease standard, ASC 842, adopted during the period, but there was no change in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the period covered by this report that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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PART II. OTHER INFORMATION

ITEM 1. Legal Proceedings
For a description of our material pending legal proceedings, please refer to Note 6 “Commitments and Contingencies – Litigation” of the Notes to Condensed Consolidated Financial Statements included in Part I, Item 1 of this Quarterly Report on Form 10-Q, which is incorporated by reference.
ITEM 1A. Risk Factors
We have identified the following additional risks and uncertainties that may affect our business, financial condition and/or results of operations. The risks described below include any material changes to and supersede the description of the risk factors disclosed in Part I, Item 1A of our Annual Report on Form 10-K for the year ended December 31, 2018, as filed with the Securities and Exchange Commission on March 1, 2019. Investors should carefully consider the risks described below, together with the other information set forth in this Quarterly Report on Form 10-Q, before making any investment decision. The risks described below are not the only ones we face. Additional risks not currently known to us or that we currently believe are immaterial may also significantly impair our business operations. Our business could be harmed by any of these risks. The trading price of our common stock could decline due to any of these risks, and investors may lose all or part of their investment.
Risks Related to Our Business and Industry
Our markets are rapidly changing, which makes it difficult to predict our future revenue and plan our expenses appropriately.
We compete in markets characterized by rapid technological change, changing needs of CSPs, evolving industry standards and frequent introductions of new products and services. We invest significant amounts to pursue innovative technologies that we believe will be adopted by CSPs. In addition, on an ongoing basis we expect to reposition our product and service offerings and introduce new products and services as we encounter rapidly changing CSP requirements and increasing competitive pressures. If we cannot increase sales of our new products and services, keep pace with rapid technological developments to meet our customers’ needs and compete with evolving industry standards or if the technologies we choose to invest in fail to meet customer needs or are not adopted by customers, the use of our products and our revenue could decline, making it difficult to forecast our future revenue and plan our operating expenses appropriately.
Adverse global economic conditions and geopolitical issues, including the U.S. tariffs imposed on imports from China, could have a negative effect on our business, results of operations and financial condition and liquidity.
As a global company, our performance is affected by global economic conditions as well as geopolitical issues. In recent years concerns about the global economic outlook have adversely affected market and business conditions in general. Macroeconomic weakness and uncertainty also make it more difficult for us to accurately forecast revenue, gross margin and expenses. Geopolitical issues, such as the ones resulting in the recent tariffs imposed by both the United States and China and the increasing tensions among China, the United States, Canada and other countries, create uncertainly for global commerce. Sustained uncertainty about, or worsening of, global economic conditions and geopolitical issues may cause our customers to reduce or delay spending and could intensify pricing pressures. Any or all of these factors could negatively affect demand for our products and our business, financial condition and result of operations. Additional risks associated with the impact of the U.S. tariffs on our business and result of operations are described in the below risk factor captioned “Until the first quarter of 2019, a significant number of the products that we sold in the United States were manufactured in China. While we have undertaken substantial efforts to realign our supply chain operations and transition manufacturing out of China to mitigate the impact of the federal government's imposition of tariffs on goods imported from China, if we fail to implement these changes to our supply chain effectively in the manner desired and within our anticipated timing, our ability to conduct our business will be materially impaired, which would adversely impact our gross margins and results of operations.”
We have a history of losses, and we may not be able to generate positive operating income and positive cash flows in the future.
We have experienced net losses in each year of our existence. We incurred net losses of $19.3 million in 2018, $83.0 million in 2017 and $27.4 million in 2016. For the first three months of 2019, we incurred a net loss of $9.8 million.

As of March 30, 2019, we had an accumulated deficit of $694.6 million.
We expect to continue to incur significant expenses and cash outlays for research and development associated with our platforms and systems, including our cloud and services operations, investments in innovative technologies, expansion of our product portfolio, sales and marketing, customer support and general and administrative functions as we expand our business

and operations and target new customer segments, primarily larger CSPs including cable multiple-system operators ("MSOs"). Given our anticipated growth and the intense competitive pressures we face, we may be unable to control our operating costs.

We cannot guarantee that we will achieve profitability in the future. We will have to generate and sustain significant and consistent increased revenue, while continuing to control our expenses, in order to achieve and then maintain profitability. We may also incur significant losses in the future for a number of reasons, including the risks discussed in this "Risk Factors" section and other factors that we cannot anticipate. If we are unable to generate positive operating income and positive cash flows from operations, our liquidity, results of operations and financial condition will be adversely affected. If we are unable to generate cash flows to support our operational needs, we may need to seek other sources of liquidity, including additional borrowings, to support our working capital needs. In addition, we may choose to seek other sources of liquidity even if we believe we have generated sufficient cash flows to support our operational needs. There is no assurance that any other sources of liquidity may be available to us on acceptable terms or at all. If we are unable to generate sufficient cash flows or obtain other sources of liquidity, we will be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, all of which would adversely impact our business and growth.

Our quarterly and annual operating results may fluctuate significantly, which may make it difficult to predict our future performance and could cause the market price of our stock to decline.

A number of factors, many of which are outside of our control, may cause or contribute to significant fluctuations in our quarterly and annual operating results. These fluctuations may make financial planning and forecasting difficult. Comparing our operating results on a period-to-period basis may not be meaningful, and you should not rely on our past results as an indication of our future performance. If our revenue or operating results fall below the expectations of investors or securities analysts, or below any guidance we may provide to the market, the market price of our stock would likely decline. Moreover, we may experience delays in recognizing revenue under applicable revenue recognition rules. Certain government-funded contracts, such as those funded by U.S. Department of Agriculture's Rural Utility Service ("RUS") include acceptance and administrative requirements that delay revenue recognition. The extent of these delays and their impact on our revenue can fluctuate considerably depending on the number and size of purchase orders under these contracts for a given time period. Furthermore, our customers who rely on government-funded programs may delay or reduce purchase activities due to U.S. federal government shutdowns, which could have a negative impact on our result of operations. In addition, unanticipated decreases in our available liquidity due to fluctuating operating results could limit our growth and delay implementation of our expansion plans.

In addition to the other risk factors listed in this "Risk Factors" section, factors that have in the past and may continue to contribute to the variability of our operating results include:

- our ability to predict our revenue and reduce and control product costs, including larger scale turnkey network improvement projects that may span several quarters;
- the impact of global economic conditions;
- the impact of transitioning our global supply chain operations to mitigate the impact of U.S. tariffs on goods imported from China;
- our ability to increase our sales to larger CSPs globally;
- the capital spending patterns of CSPs and any decrease or delay in capital spending by CSPs due to macro-economic conditions, regulatory uncertainties or other reasons;
- the impact of government-sponsored programs on our customers and the impact to our customers of U.S. federal government shutdown on such programs;
- intense competition;
- our ability to develop new products or enhancements that support technological advances and meet changing CSP requirements;
- our ability to ramp sales and achieve market acceptance of our new products and CSPs' willingness to deploy our new products;
- the concentration of our customer base as well as our dependence on a limited number of key customers;
- the length and unpredictability of our sales cycles and timing of orders;

- our lack of long-term, committed-volume purchase contracts with our customers;
- our exposure to the credit risks of our customers;

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- fluctuations in our gross margin;
- the interoperability of our products with CSP networks;
- our dependence on sole-, single- and limited-source suppliers;
- our ability to manage our relationships with our third-party vendors, including CMs, ODMs, logistics providers, component suppliers and development partners;
- our ability to forecast our manufacturing requirements and manage our inventory;
- our products' compliance with industry standards;
- our ability to expand our international operations;
- our ability to protect our intellectual property and the cost of doing so;
- the quality of our products, including any undetected hardware defects or bugs in our software;
- our ability to estimate future warranty obligations due to product failure rates;
- our ability to obtain necessary third-party technology licenses at reasonable costs;
- the regulatory and physical impacts of climate change and other natural events;
- the attraction and retention of qualified employees and key management personnel;
- our ability to build and sustain an adequate and secure information technology infrastructure; and
- our ability to maintain proper and effective internal controls.

Our gross margin may fluctuate over time, and our current level of gross margin may not be sustainable.

Our current level of gross margin may not be sustainable and may be adversely affected by numerous factors, including:

- changes in customer, geographic or product mix, including the mix of configurations within each product group;
- the pursuit or addition of new large customers;
- increased price competition, including the impact of customer discounts and rebates;
- the impact of transitioning our global supply chain operations to mitigate the impact of U.S. tariffs on goods imported from China;
- our ability to reduce and control product costs;
- an increase in revenue mix toward services, which typically have lower margins;
- changes in component pricing;
- changes in pricing with our third-party manufacturing partners;
- charges incurred due to inventory holding periods if parts ordering does not correctly anticipate product demand;
- introduction of new products and new technologies, which may involve higher component costs;
- our ability to scale our services business in order to gain desired efficiencies;
- changes in shipment volume;
- changes in or increased reliance on distribution channels;
- potential liabilities associated with increased reliance on third-party vendors;
- increased expansion efforts into new or emerging markets;
- increased warranty costs;
- excess and obsolete inventory and inventory holding charges;
- expediting costs incurred to meet customer delivery requirements; and
- potential costs associated with contractual obligations.

Until the first quarter of 2019, a significant number of the products that we sold in the United States were manufactured in China. While we have undertaken substantial efforts to realign our supply chain operations and transition manufacturing out of China to mitigate the impact of the federal government's imposition of tariffs on goods imported from China, if we fail to implement these changes to our supply chain effectively in the manner desired and within our anticipated timing, our ability to conduct our business will be materially impaired, which would adversely impact our gross margins and results of operations.

In 2018, the U.S. federal government imposed significant tariffs on goods imported from China with proposed additional tariffs of $200 billion or more covering a broader list of goods imported from China. Until the first quarter of 2019, a significant number of the products that we sold in the United States were manufactured in China. As a result, we undertook substantial efforts to realign our supply chain operations and transition manufacturing out of China to mitigate the impact of the federal government’s imposition of tariffs on goods imported from China. Although we have been actively working to modify our supply chain operations to mitigate the impact of these tariffs, transition of global supply chain operations is complex, requires significant resources, involves significant third-party dependencies and carries numerous risks of disruptions to the manufacture and supply of our products, delays in implementation of our transition plans and significant unanticipated costs, including exacerbation of the risks associated with our reliance upon third-party manufacturing and supply partners. In particular, in the first quarter of 2019 we experienced product shortages due to production delays associated with the transition of our global supply chain operations that impaired our ability to fulfill customer orders and resulted in revenue below our plan. We have had to invest additional resources to address these challenges, including significant efforts managing third parties upon whom we rely heavily for our product manufacture and supply. Disruptions, continued product unavailability, delays or unanticipated costs associated with the supply of our products related to our transition efforts could impair our ability to meet customer requirements, result in cancellation of orders and harm our relationships with our customers, all of which could materially impact our revenues, gross margin and results of operations. There is no assurance that we can secure our desired rates for the manufacture and supply of our products with new supply chain partners, and we may face higher costs as a result. If we fail to implement our supply chain realignment effectively in the manner desired and within our anticipated timing, our ability to conduct our business will be materially impaired, which would adversely impact our gross margins and results of operations. Additional risks associated with our reliance upon third-party manufacturing and supply partners are described in the below risk factors captioned “We utilize domestic and international third-party vendors to assist in the design, development and manufacture of certain of our products, and to provide logistics services in the distribution of our products. If these vendors fail to provide these services, we could incur additional costs and delays or lose revenue” and “If we fail to forecast our manufacturing requirements accurately or fail to properly manage our inventory with our contract manufacturers, we could incur additional costs, experience manufacturing delays and lose revenue.”

The imposition of any additional tariffs or trade restrictions that may be implemented by the United States or other countries in connection with a global trade war could increase the cost of our products manufactured in China or other countries, which in turn could adversely affect the demand for these products and have a material adverse effect on our business, gross margins and results of operations.

We do not have manufacturing capabilities, and therefore we depend upon a small number of CMs and ODMs. We do not have supply contracts with all of these CMs and ODMs. Consequently, our operations could be disrupted if we encounter problems with any of these CMs or ODMs.

We do not have internal manufacturing capabilities and rely upon a small number of CMs and ODMs to build our products. Our reliance on a small number of CMs and ODMs makes us vulnerable to possible supply and capacity constraints and reduced control over component availability, delivery schedules, quality, manufacturing yields and costs.

We do not have supply contracts with some of our CMs and ODMs. Consequently, these manufacturers are not obligated to supply products to us for any specific period, in any specific quantity or at any certain price. In addition, we are dependent upon our CMs’ and ODMs’ quality systems and controls and the adherence of such systems and controls to applicable standards. If our CMs and ODMs fail to maintain levels of quality manufacture suitable for us or our customers, we may incur higher costs and our relationships with our customers may be harmed.

The revenue that our CMs and ODMs generate from our orders represent a relatively small percentage of their overall revenue. As a result, fulfilling our orders may not be considered a priority if such manufacturers are constrained in their ability to fulfill all of their customer obligations in a timely manner. In addition, a substantial part of our manufacturing is done in our manufacturers' facilities that are located outside of the United States. We believe that the location of these facilities outside of the United States increases supply risk, including the risk of supply interruptions or reductions in manufacturing quality or controls. Moreover, regulatory changes or government actions relating to export or import regulations, economic sanctions or related legislation, or the possibility of such changes or actions, may create uncertainty or result in changes to or disruption in our operations with our manufacturers.

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In particular, as we transition our global supply chain operations to mitigate the impact of U.S. tariffs imposed on goods imported from China, we have experienced and may continue to experience disruptions and delays associated with reliance on third-party manufacturing. Additional risks associated with the transition of our supply chain operations to mitigate the impact of tariffs are described in the above risk factor captioned "Until the first quarter of 2019, a significant number of the products that we sold in the United States were manufactured in China. While we have undertaken significant efforts to re-engineer and realign our supply chain operations to avoid incurrence of the federal government's imposition of tariffs on goods imported from China, if we fail to implement these changes to our supply chain effectively in the manner desired and within our anticipated timing, our ability to conduct our business will be materially impaired, which would adversely impact our gross margins and results of operations."

If any of our CMs or ODMs were unable or unwilling to continue manufacturing our products in required volumes and at high quality levels, we would have to identify, qualify and select acceptable alternative manufacturers. An alternative manufacturer may not be available to us when needed or may not be in a position to satisfy our production requirements at commercially reasonable prices and quality. Any significant interruption in manufacturing, including labor shortages, would require us to reduce our supply of products to our customers, which in turn would reduce our revenue and harm our relationships with our customers.

We utilize domestic and international third-party vendors to assist in the design, development and manufacture of certain of our products, and to provide logistics services in the distribution of our products. If these vendors fail to provide these services, we could incur additional costs and delays or lose revenue.

From time to time we enter into agreements for the design, development and/or manufacture of certain of our products in order to enable us to offer products on an accelerated basis. We also rely upon limited third party vendors for logistics services to distribute our products. If any of these third-party vendors stop providing their services, for any reason, we would have to obtain similar services from alternative sources, which may not be available on commercially reasonable terms, if at all. We also have limited control over disruptions that may occur at the facilities of these third-party partners, such as supply interruptions, labor shortages or manufacturing quality that may occur at manufacturing facilities and strikes or systems failures that may interrupt transportation and logistics services. In addition, switching development firms or manufacturers could require us to extend our development timeline and/or re-qualify our products with our customers, which would also be costly and time-consuming.

Any interruption in the development, supply or distribution of our products would adversely affect our ability to meet scheduled product deliveries to our customers, or exacerbate delays in customer order fulfillment that have already resulted from recent product unavailability related to the supply chain transition efforts described above, and could result in lost revenue or higher costs, which would negatively impact our margins and operating results and harm our business.

If we fail to forecast our manufacturing requirements accurately or fail to properly manage our inventory with our CMs and ODMs, we could incur additional costs, experience manufacturing delays and lose revenue.

We bear inventory risk under our CM and ODM arrangements. Lead times for the materials and components that we order through our manufacturers vary significantly and depend on numerous factors, including the specific supplier, contract terms and market demand for a component at a given time. Lead times for certain key materials and components incorporated into our products are currently lengthy, requiring our manufacturers to order materials and components several months in advance of manufacture.

If we overestimate our production requirements, our manufacturers may purchase excess components and build excess inventory. If our manufacturers, at our request, purchase excess components that are unique to our products or build excess products, we could be required to pay for these excess parts or products and their storage costs. Historically, we have reimbursed our primary contract manufacturers for a portion of inventory purchases when our inventory has been rendered excess or obsolete. Examples of when inventory may be rendered excess or obsolete include manufacturing and engineering change orders resulting from design changes or in cases where inventory levels greatly exceed projected demand. If we incur payments to our manufacturers associated with excess or obsolete inventory, this may have an adverse effect on our gross margins, financial condition and results of operations.

We have experienced unanticipated increases in demand from customers, which resulted in delayed shipments and variable shipping patterns. If we underestimate our product requirements, our manufacturers may have inadequate component inventory, which could interrupt manufacturing of our products, increase our cost of product revenue associated with expedite fees and air freight and/or result in delays or cancellation of sales.

Furthermore, we have experienced and may continue to experience production interruptions from our manufacturers as we transition our global supply chain operations to mitigate the impact of U.S. tariffs imposed on goods imported from China. Additional risks associated with the transition of our supply chain operations to mitigate the impact of substantial tariffs are described in the above risk factor captioned “Until the first quarter of 2019, a significant number of the products that we sold in

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the United States were manufactured in China. While we have undertaken significant efforts to re-engineer and realign our supply chain operations to avoid incurrence of the federal government's imposition of tariffs on goods imported from China, if we fail to implement these changes to our supply chain effectively in the manner desired and within our anticipated timing, our ability to conduct our business will be materially impaired, which would adversely impact our gross margins and results of operations."

We and our business partners, including our manufacturers and suppliers, depend on sole-source, single-source and limited-source suppliers for some key components. If we and our business partners are unable to source these components on a timely or cost-effective basis, we will not be able to deliver our products to our customers.

We and our business partners, including our manufacturers and suppliers, depend on sole-source, single-source and limited-source suppliers for some key components of our products. For example, certain of our application-specific integrated circuit processors and resistor networks are purchased from sole-source suppliers.

Any of the sole-source, single-source and limited-source suppliers upon whom we or our business partners rely could stop producing our components, cease operations, or enter into exclusive arrangements with our competitors. We may also experience shortages or delay of critical components as a result of growing demand in the industry or other sectors. For example, growth in electronic and IoT devices, wireless products, automotive electronics and artificial intelligence all drive increased demand for certain components, such as chipsets and memory products, which may result in lower availability and increased prices for such components. The cost of components may also be impacted by regulatory requirements.

In addition, purchase volumes of such components may be too low for Calix to be considered a priority customer by these suppliers, and we may not be able to negotiate commercially reasonable terms for our business needs. As a result, these suppliers could stop selling to us and our business partners at commercially reasonable prices, or at all. Any such interruption or delay may force us and our business partners to seek similar components from alternative sources, which may not be available, or result in higher than anticipated prices for such components. Switching suppliers could also require that we redesign our products to accommodate new components and could require us to re-qualify our products with our customers, which would be costly and time consuming. Any interruption in the supply of sole-source, single-source or limited-source components for our products would adversely affect our ability to meet scheduled product deliveries to our customers, could result in lost revenue or higher expenses and would harm our business.

Our business is dependent on the capital spending patterns of CSPs, and any decrease or delay in capital spending by CSPs in response to economic conditions, seasonality, uncertainties associated with the implementation of regulatory reform or otherwise would reduce our revenue and harm our business.

Demand for our products depends on the magnitude and timing of capital spending by CSPs as they construct, expand, upgrade and maintain their access networks. Any future economic downturn may cause a slowdown in telecommunications industry spending, including in the specific geographies and markets in which we operate. In response to reduced consumer spending, challenging capital markets or declining liquidity trends, capital spending for network infrastructure projects of CSPs could be delayed or canceled. In addition, capital spending is cyclical in our industry, sporadic among individual CSPs and can change on short notice. As a result, we may not have visibility into changes in spending behavior until nearly the end of a given quarter.

CSP spending on network construction, maintenance, expansion and upgrades is also affected by reductions in their budgets, delays in their purchasing cycles, access to external capital (such as government grants and loan programs or the capital markets) and seasonality and delays in capital allocation decisions. For example, our CSP customers tend to spend less in the first quarter as they are still finalizing their annual budgets and in certain regions customers are also challenged by winter weather conditions that inhibit outside fiber deployment, resulting in weaker demand for our products in the first quarter of our fiscal year. Also, softness in demand across any of our customer markets, including due to macro-economic conditions beyond our control or uncertainties associated with the implementation of regulatory reform, has in the past and could in the future lead to unexpected slowdown in capital expenditures by service providers.

Many factors affecting our results of operations are beyond our control, particularly in the case of large CSP orders and network infrastructure deployments involving multiple vendors and technologies where the achievement of certain thresholds for acceptance is subject to the readiness and performance of the CSP or other providers and changes in CSP requirements or installation plans. Further, CSPs may not pursue investment for our new platforms or infrastructure upgrades that require our access systems and software. Infrastructure improvements may be delayed or prevented by a variety of factors including cost, regulatory obstacles (including uncertainties associated with the implementation of regulatory reforms), mergers, lack of consumer demand for advanced communications services and alternative approaches to service delivery. Reductions in capital expenditures by CSPs, particularly CSPs that are significant customers, may have a material negative impact on our revenue and results of operations and slow our rate of revenue growth. As a consequence, our results for a particular period may be difficult to predict, and our prior results are not necessarily indicative of results in future periods.

Government-sponsored programs and the recent U.S. federal government shutdown could impact the timing and buying patterns of CSPs, which may cause fluctuations in our operating results.

We sell to CSPs, which include U.S.-based independent operating companies ("IOCs"), which have revenue that is particularly dependent upon interstate and intrastate access charges and federal and state subsidies. The Federal Communication Commission ("FCC") and some states may consider changes to such payments and subsidies, and these changes could reduce IOC revenue. Furthermore, many IOCs use or expect to use government-supported loan programs or grants, such as RUS loans and grants, to finance capital spending. These government-supported loan programs and grants generally include conditions such as deployment criteria, domestic preference provisions and other requirements that apply to the project and selected equipment as conditions for funding. Changes to the terms or administration of these programs, including uncertainty from government and administrative change, potential funding limitations that impact our ability to meet program requirements or funding delays due to the recent U.S. federal government shutdown could reduce the ability of IOCs to access capital or secure funding under government-funded programs to purchase our products and services and thus reduce our revenue opportunities.

Many of our customers were awarded grants or loans under government stimulus programs such as the Broadband Stimulus programs under the American Recovery and Reinvestment Act of 2009 and the funds distributed under the FCC's Connect America Fund ("CAF") program, and have purchased and will continue to purchase products from us or other suppliers while such programs and funding are available. However, customers may substantially curtail purchases as funding winds down or as planned purchases are completed.

In addition to the impact of the recent U.S. federal government shutdown, any further government shutdowns or any changes in government regulations and subsidies could cause our customers to change their purchasing decisions, which could have an adverse effect on our operating results and financial condition.

We face intense competition that could reduce our revenue and adversely affect our financial results.

The market for our products is highly competitive, and we expect competition from both established and new companies to increase. Our competitors include companies such as ADTRAN, Inc.; Arris Group, Inc. (acquired by CommScope Inc.); Casa Systems; Ciena Corporation; Cisco Systems Inc.; DASAN Zhone Solutions, Inc.; Huawei Technologies Co. Ltd.; Juniper Networks Inc.; Nokia Corporation and ZTE Corporation, among others.

Our ability to compete successfully depends on a number of factors, including:

- the successful development of new products;
- our ability to anticipate CSP and market requirements and changes in technology and industry standards;
- our ability to differentiate our products from our competitors' offerings based on performance, cost-effectiveness or other factors;
- our ongoing ability to successfully integrate acquired product lines and customer bases into our business;
- our ability to meet increased customer demand for professional services associated with network improvement projects;
- our ability to gain customer acceptance of our products; and
- our ability to market and sell our products.

The broadband access equipment market has undergone and continues to undergo consolidation, as participants have merged, made acquisitions or entered into partnerships or other strategic relationships with one another to offer more comprehensive solutions than they individually had offered. Examples include Arris' acquisition of Pace plc in January 2016; Nokia's acquisition of Alcatel-Lucent in January 2016; the merger of DASAN Zhone Solutions with DASAN Network Solutions in September 2016; and CommScope's acquisition of Arris in the first quarter of 2019. We expect this trend to continue as companies attempt to strengthen or maintain their market positions in an evolving industry.

Many of our current or potential competitors have longer operating histories, greater name recognition, larger customer bases and significantly greater financial, technical, sales, marketing and other resources than we do and are better positioned to acquire and offer complementary products and services. Many of our competitors have broader product lines and can offer bundled solutions, which may appeal to certain customers. Our competitors may also invest additional resources in developing more compelling product offerings. Potential customers may also prefer to purchase from their existing suppliers rather than a new supplier, regardless of product performance or features, because the products that we and our competitors offer require a substantial investment of time and funds to qualify

and install.
Some of our competitors may offer substantial discounts or rebates to win new customers or to retain existing customers. If we are forced to reduce prices in order to secure customers, we may be unable to sustain gross margin at desired levels or achieve

profitability. Competitive pressures could result in increased pricing pressure, reduced profit margin, increased sales and marketing expenses and failure to increase, or the loss of, market share, any of which could reduce our revenue and adversely affect our financial results.

An increase in revenue mix towards services will adversely affect our gross margin.

In response to greater customer demand for certain professional and support services for our products, we continue to invest and grow our services business. Our services include professional services associated with turnkey network improvement projects, product support services, managed services to help our customers manage and optimize their networks and education and certification services, which typically have a lower gross margin than product purchases. For example, revenue recognized from turnkey network improvement projects whereby we supply products and related professional services such as network planning, product installation, testing and network turn up may be delayed because of the timing of completion and acceptance of a project or milestone, including third-party delays that may be outside our control. We also rely upon third-party subcontractors to assist with some of our professional and support services projects, which generally result in higher costs and increased risk of cost overruns, which can negatively impact our gross margin. Moreover, if we are unable to achieve desired efficiencies and scale as we ramp and develop our services business, we may incur higher than expected costs, which can further adversely impact our gross margin.

Product development is costly, and if we fail to develop new products or enhancements that meet changing CSP requirements, we could experience lower sales.

Our industry is characterized by rapid technological advances, frequent new product introductions, evolving industry standards and unanticipated changes in subscriber requirements. Our future success will depend significantly on our ability to anticipate and adapt to such changes, and to offer, on a timely and cost-effective basis, products and features that meet changing CSP demands and industry standards. We intend to continue to invest in developing new products and enhancing the functionality of our platforms, including to reach a broader set of customers. Developing our products is expensive and complex and involves uncertainties, including pricing risks from sourcing sufficient quantities of custom components from limited suppliers on terms which may not be commercially acceptable for us. We may not have sufficient resources to successfully manage lengthy product development cycles. Our research and development expenses were $90.0 million, or 20% of our revenue, in 2018, $127.5 million, or 25% of our revenue, in 2017 and $106.9 million, or 23% of our revenue, in 2016. For the first three months of 2019, our research and development expenses were $19.3 million, or 22% of our revenue. We believe that we must continue to dedicate a significant amount of resources to our research and development efforts, including increased reliance on third-party development partners, to maintain our competitive position. These investments may take several years to generate positive returns, if ever. In addition, we may experience design, manufacturing, marketing and other difficulties that could delay or prevent the development, introduction or marketing of new products and enhancements. If we fail to meet our development targets, demand for our products will decline.

In addition, the introduction of new or enhanced products also requires that we manage the transition from older products to these new or enhanced products in order to minimize disruption in customer ordering patterns, fulfill ongoing customer commitments and ensure that adequate supplies of new products are available for delivery to meet anticipated customer demand. If we fail to maintain compatibility with other software or equipment found in our customers' existing and planned networks, we may face substantially reduced demand for our products, which would reduce our revenue opportunities and market share. Moreover, as customers complete infrastructure deployments, they may require greater levels of service and support than we have provided in the past. We may not be able to provide products, services and support to compete effectively for these market opportunities. If we are unable to anticipate and develop new products or enhancements to our existing products on a timely and cost-effective basis, we could experience lower sales, which would harm our business.

Our new products are early in their life cycles and subject to uncertain market demand. If our customers are unwilling to install our new products or deploy our new services, or we are unable to achieve market acceptance of our new products, our business and financial results will be harmed.

Our new products are early in their life cycles and subject to uncertain market demand. They also may face obstacles in manufacturing, deployment and competitive response. Potential customers may choose not to invest the additional capital required for initial system deployment of new products. In addition, demand for new products is dependent on the success of our customers in deploying and selling advanced services to their subscribers. Our products support a variety of advanced broadband services, such as high-speed Internet, Internet protocol television, mobile broadband, high-definition video and online gaming. If we are unable to ramp sales of our new products, or if subscriber demand for our services does not grow as expected or declines, or our customers are unable or unwilling to deploy and market these services, demand for our products may decrease or fail to grow at rates we anticipate.

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Our customer base is concentrated, and there are a limited number of potential customers for our products. The loss of any of our key customers, a decrease in purchases by our key customers, pricing pressures or our inability to grow our customer base would adversely impact our revenue and results of operations and any delays in payment by a key customer could negatively impact our cash flows and working capital.

Historically, a large portion of our sales has been to a limited number of customers. For example, one customer accounted for 18% of our revenue in 2018, 31% of our revenue in 2017 and 21% of our revenue in 2016, and another customer accounted for 15% of our revenue in 2016. However, we cannot anticipate the level of purchases in the future by these customers. Customer purchases may be delayed or impacted due to financial difficulties, spending cuts or corporate consolidations. For example, one of our large customers completed a large acquisition at the end of 2017, which continues to disrupt its normal expenditure plans, including prolonged delays and reduction in purchases of our products and services as it continues to finalize its transition activities and corporate strategies. We have experienced and expect to continue to experience delays or declines in purchases by certain CSPs due to deterioration and weakness in their financial condition. For example, Windstream, another one of our larger customers, recently filed a voluntary petition for relief under Chapter 11 of the U.S. Bankruptcy Code after it was found in default of certain debt instruments. Any decrease or delay in purchases and/or capital expenditure plans of any of our key customers, or our inability to grow our sales with existing customers, may have a material negative impact on our revenue and results of operations.

We anticipate that a large portion of our revenue will continue to depend on sales to a limited number of customers. In addition, some larger customers may demand discounts and rebates or desire to purchase their access systems and software from multiple providers. As a result of these factors, our future revenue opportunities may be limited, and we may face pricing pressures, which in turn could adversely impact our margins and our profitability. The loss of, reduction in or pricing discounts associated with, orders from any key customer would significantly reduce our revenue and harm our business. Furthermore, delays in payment and/or extended payment terms from any of our key or larger customers could have a material negative impact on our cash flows and working capital to support our business operations.

Furthermore, in recent years, the CSP market has undergone substantial consolidation. Industry consolidation generally has negative implications for equipment suppliers, including a reduction in the number of potential customers, a decrease in aggregate capital spending and greater pricing leverage on the part of CSPs over equipment suppliers. Continued consolidation of the CSP industry and among independent local exchange carriers and IOC customers, who represent a large part of our business, could make it more difficult for us to grow our customer base, increase sales of our products and maintain adequate gross margin.

Our sales cycles can be long and unpredictable, and our sales efforts require considerable time and expense. As a result, our sales are difficult to predict and may vary substantially from quarter to quarter, which may cause our operating results to fluctuate significantly.

The timing of our revenue is difficult to predict. Our sales efforts often involve educating CSPs about the use and benefits of our products. CSPs typically undertake a significant evaluation process, which frequently involves not only our products but also those of our competitors and results in a lengthy sales cycle. Sales cycles for larger customers are relatively longer and require considerably more time and expense. We spend substantial time, effort and money in our sales efforts without any assurance that our efforts will produce sales. In addition, product purchases are frequently subject to budget constraints, multiple approvals and unplanned administrative, processing and other delays. The timing of revenue related to sales of products and services that have installation requirements may be difficult to predict due to interdependencies that may be beyond our control, such as CSP testing and turn-up protocols or other vendors’ products, services or installations of equipment upon which our products and services rely. Such delays may result in fluctuations in our quarterly revenue. If sales expected from a specific customer for a particular quarter are not realized in that quarter or at all, we may not achieve our revenue forecasts and our financial results would be adversely affected.

Our focus on CSPs with relatively small networks limits our revenue from sales to any one customer and makes our future operating results difficult to predict.

A large portion of our sales efforts continue to be focused on CSPs with relatively small networks, cable MSOs and selected international CSPs. Our current and potential customers generally operate small networks with limited capital expenditure budgets. Accordingly, we believe the potential revenue from the sale of our products to any one of these customers is limited. As a result, we must identify and sell products to new customers each quarter to continue to increase our sales. In addition, the spending patterns of many of our customers are characterized by small and sporadic purchases. As a consequence, we have limited backlog and will likely continue to have limited visibility into future operating results.

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We do not have long-term, committed-volume purchase contracts with our customers, and therefore have no guarantee of future revenue from any customer.

We typically have not entered into long-term, committed-volume purchase contracts with our customers, including our key customers which account for a material portion of our revenue. As a result, any of our customers may cease to purchase our products at any time. In addition, our customers may attempt to renegotiate terms of sale, including price and quantity. If any of our key customers stop purchasing our access platforms, systems and software for any reason, our business and results of operations would be harmed.

Our efforts to increase our sales to CSPs globally, including cable MSOs, may be unsuccessful.

Our sales and marketing efforts have been focused on CSPs in North America. Part of our long-term strategy is to increase sales to CSPs globally, including cable MSOs. We have devoted and continue to devote substantial technical, marketing and sales resources to these larger CSPs, who have lengthy equipment qualification and sales cycles, without any assurance of generating sales. In particular, sales to these larger CSPs may require us to upgrade our products to meet more stringent performance criteria and interoperability requirements, develop new customer-specific features or adapt our products to meet international standards. Implementing these requirements and features is costly and could negatively impact our operating results, financial condition and cash flows. Moreover, if we are unable to obtain materials at favorable costs, our margins and profitability could be adversely impacted. For example, we work with large CSPs in testing and laboratory trials for our NG-PON2 technology and MSO applications. We have invested and expect to continue to invest considerable time, effort and expenditures, including investment in product research and development, related to these opportunities without any assurance that our efforts will produce orders or revenue. If we are unable to successfully increase our sales to larger CSPs, our operating results, financial condition, cash flows and long-term growth may be negatively impacted.

We are exposed to the credit risks of our customers; if we have inadequately assessed their creditworthiness, we may have more exposure to accounts receivable risk than we anticipate. Failure to collect our accounts receivable in amounts that we anticipate could adversely affect our operating results and financial condition.

In the course of our sales to customers, we may encounter difficulty collecting accounts receivable and could be exposed to risks associated with uncollectible accounts receivable. We maintain an allowance for doubtful accounts for estimated losses resulting from the inability or unwillingness of our customers to make required payments. However, these allowances are based on our judgment and a variety of factors and assumptions.

We perform credit evaluations of our customers' financial condition. However, our evaluation of the creditworthiness of customers may not be accurate if they do not provide us with timely and accurate financial information, or if their situations change after we evaluate their credit. While we attempt to monitor these situations carefully, adjust our allowances for doubtful accounts as appropriate and take measures to collect accounts receivable balances, we have written down accounts receivable and written off doubtful accounts in prior periods and may be unable to avoid additional write-downs or write-offs of doubtful accounts in the future. Such write-downs or write-offs could negatively affect our operating results for the period in which they occur and could harm our financial condition.

Our products must interoperate with many software applications and hardware products found in our customers' networks. If we are unable to ensure that our products interoperate properly, our business will be harmed.

Our products must interoperate with our customers' existing and planned networks, which often have varied and complex specifications, utilize multiple protocol standards, include software applications and products from multiple vendors and contain multiple generations of products that have been added over time. As a result, we must continually ensure that our products interoperate properly with these existing and planned networks. To meet these requirements, we must undertake development efforts that require substantial capital investment and employee resources. We may not accomplish these development goals quickly or cost-effectively, if at all. If we fail to maintain compatibility with other software or equipment found in our customers' existing and planned networks, we may face substantially reduced demand for our products, which would reduce our revenue opportunities and market share.

We have entered into interoperability arrangements with a number of equipment and software vendors for the use or integration of their technology with our products. These arrangements give us access to and enable interoperability with various products that we do not otherwise offer. If these relationships fail, we may have to devote substantially more resources to the development of alternative products and processes and our efforts may not be as effective as the combined solutions under our current arrangements. In some cases, these other vendors are either companies that we compete with directly or companies that have extensive relationships with our existing and potential customers and may have influence over the purchasing decisions of those customers. Some of our competitors have stronger relationships with some of our existing and other potential interoperability partners, and as a result, our ability to have successful interoperability arrangements with these companies may be harmed. Our failure to establish or maintain key relationships with third-party equipment and software vendors may harm our ability to successfully sell and market our products.

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The quality of our support and services offerings is important to our customers, and if we fail to continue to offer high quality support and services, we could lose customers, which would harm our business.

Once our products are deployed within our customers' networks, they depend on our support organization to resolve any issues relating to those products. A high level of support is critical for the successful marketing and sale of our products. Furthermore, our services to customers have increasingly broadened to include network design and services to deploy our products within our customers' networks, such as our professional services associated with turnkey network improvement projects for our customers. If we do not effectively assist our customers in deploying our products, succeed in helping them quickly resolve post-deployment issues or provide effective ongoing support, it could adversely affect our ability to sell our products to existing customers and harm our reputation with potential new customers. As a result, our failure to maintain high quality support and services could result in the loss of customers, which would harm our business.

Our products are highly technical and may contain undetected hardware defects or software bugs, which could harm our reputation and adversely affect our business.

Our products, including our cloud and software platforms and systems, are highly technical and, when deployed, are critical to the operation of many networks. Our products have contained and may contain undetected defects, bugs or security vulnerabilities, which risks may be exacerbated as we continue to expand our cloud and software portfolio. Some defects in our products may only be discovered after a product has been installed and used by customers and may in some cases only be detected under certain circumstances or after extended use. Any errors, bugs, defects or security vulnerabilities discovered in our products after commercial release could result in loss of revenue or delay in revenue recognition, loss of customers and increased service and warranty and retrofit costs, any of which could adversely affect our business, operating results and financial condition. In addition, we could face claims for product liability, tort or breach of warranty. Our contracts with customers contain provisions relating to warranty disclaimers and liability limitations, which may not be upheld. Defending a lawsuit, regardless of its merit, is costly and may divert management's attention and adversely affect the market's perception of us and our products. In addition, if our business liability insurance coverage proves inadequate or future coverage is unavailable on acceptable terms or at all, our business, operating results and financial condition could be adversely impacted.

Privacy concerns relating to our products and services could affect our business practices, damage our reputation and deter customers from purchasing our products and services.

Government and regulatory authorities in the United States and around the world have implemented and are continuing to implement broader and more stringent laws and regulations concerning data protection. For example, in July 2016, the European Commission adopted the EU-U.S. Privacy Shield to replace Safe Harbor as a compliance mechanism for the transfer of personal data from the European Union to the United States. In addition, the General Data Protection Regulation ("GDPR") adopted by the EU Parliament became effective in May 2018 to harmonize data privacy laws across Europe. Among other requirements, the GDPR imposes specific duties and requirements upon companies that collect, process or control personal data of EU residents. Although we currently do not have material operations or business in the EU, the GDPR regulations could cause us to incur substantial costs in order to expand our business or deliver certain services in the EU. Furthermore, the GDPR imposes penalties for noncompliance of up to the greater of €20 million or 4% of a company's worldwide revenue; accordingly, any non-compliance with the GDPR could result in a material adverse effect on our business, financial condition and results of operations. Similarly, in June 2018, California passed the California Consumer Privacy Act which provides new data privacy rights for consumers and new operational requirements for companies effective in 2020. The interpretation and application of these data protection laws and regulations are often uncertain and in flux, and it is possible that they may be interpreted and applied in a manner that is inconsistent with our data practices. Complying with emerging and changing laws could cause us to incur substantial costs or require us to change our business practices in a manner adverse to our business.

Concerns about or regulatory actions involving our practices with regard to the collection, use, disclosure, or security of customer information or other privacy related matters, even if unfounded, could damage our reputation and adversely affect operating results. While we strive to provide transparency about our collection, use, disclosure and security over any personal data and to comply with all applicable data protection laws and regulations, the failure or perceived failure to comply may result in inquiries and other proceedings or actions against us by government entities or others, or could cause us to lose customers, which could potentially have an adverse effect on our business.

We are subject to cybersecurity and privacy risks.

Our information systems and data centers (including third-party data centers) contain sensitive information that help us operate our business efficiently, interface with and provide software solutions to customers, maintain financial accuracy and accurately produce our financial statements. In addition, we host sensitive data in data centers, including subscriber data, in the course of providing services and solutions to customers. Malicious hackers may attempt to gain access to our network or data centers; steal proprietary information related to our business, products, employees, and customers; or interrupt our systems and services or those of our customers or others. The theft, loss, or misuse of personal data collected, used, stored or transferred by us to run our business could result in significantly increased security and remediation costs or costs related to defending legal claims. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to cyberattacks, transaction errors, processing inefficiencies, the loss of customers, business disruptions or the loss of or damage to intellectual property through security breaches. If our data management systems, including those of our third-party data centers, do not effectively and securely collect, store, process and report relevant data for the operation of our business, whether due to cyberattacks, equipment malfunction or constraints, software deficiencies or human error, our ability to effectively plan, forecast and execute our business plan and comply with laws and regulations will be impaired, perhaps materially. Any such impairment could materially and adversely affect our financial condition, results of operations, cash flows, the timeliness with which we internally and externally report our operating results and our business and reputation.

While we have applied multiple layers of security to control access to our information technology systems and use encryption and authentication technologies to secure the transmission and storage of data, these security measures may be compromised as a result of third-party security breaches, employee error, malfeasance, faulty password management or other irregularity, and result in persons obtaining unauthorized access to our data or accounts. Third parties may attempt to fraudulently induce employees into disclosing user names, passwords or other sensitive information, which may in turn be used to access our information technology systems.

While we seek to apply best practice policies and devote significant resources to network security, data encryption and other security measures to protect our information technology and communications systems and data, these security measures cannot provide absolute security. We or our third-party hosting providers may experience a system breach and be unable to protect sensitive data. The costs to us to eliminate or alleviate network security problems, bugs, viruses, worms, malicious software programs and security vulnerabilities could be significant, and our efforts to address these problems may not be successful and could result in unexpected interruptions, delays and cessation of service which may harm our business operations.

Although our systems have been designed around industry-standard architectures to reduce downtime in the event of outages or catastrophic occurrences, they remain vulnerable to damage or interruption from earthquakes, floods, fires, power loss, telecommunication failures, terrorist attacks, cyberattacks, viruses, denial-of-service attacks, human error, hardware or software defects or malfunctions, and similar events or disruptions. Some of our systems are not fully redundant, and our disaster recovery planning is not sufficient for all eventualities. Our systems are also subject to break-ins, sabotage and intentional acts of vandalism. Despite any precautions we may take, the occurrence of a natural disaster, a decision by any of our third-party hosting providers to close a facility we use without adequate notice for financial or other reasons, a data breach or other unanticipated problems at our hosting facilities could cause system interruptions and delays which may result in loss of critical data and lengthy interruptions in our services.

Our estimates regarding future warranty or product obligations may change due to product failure rates, shipment volumes, field service obligations and rework costs incurred in correcting product failures. If our estimates change, the liability for warranty or product obligations may be increased, impacting future cost of revenue.

Our products are highly complex, and our product development, manufacturing and integration testing may not be adequate to detect all defects, errors, failures and quality issues. Quality or performance problems for products covered under warranty could adversely impact our reputation and negatively affect our operating results and financial position. The development and production of new products with high complexity often involves problems with software, components and manufacturing methods. If significant warranty or other product obligations arise due to reliability or quality issues arising from defects in software, faulty components or improper manufacturing methods, our operating results and financial position could be negatively impacted by:

- cost associated with fixing software or hardware defects;
- high service and warranty expenses;
- high inventory obsolescence expense;
- delays in collecting accounts receivable;
- payment of liquidated damages for performance failures; and
- declining sales to existing customers.

As the market for our products evolves, changing customer requirements may adversely affect the valuation of our inventory.

Customer demand for our products can change rapidly in response to market and technology developments. Demand can be affected not only by customer- or market-specific issues, but also by broader economic and/or geopolitical factors. We may, from time to time, adjust inventory valuations downward in response to our assessment of demand from our customers for specific products or product lines. The related excess inventory charges may have an adverse effect on our gross margin, financial condition and results of operations.

If we fail to comply with evolving industry standards, sales of our existing and future products would be adversely affected.

The markets for our products are characterized by a significant number of standards, both domestic and international, which are evolving as new technologies are developed and deployed. As we expand into adjacent markets and increase our international footprint, we are likely to encounter additional standards. Our products must comply with these standards in order to be widely marketable. In some cases, we are compelled to obtain certifications or authorizations before our products can be introduced, marketed or sold in new markets or to customers that we have not historically served. For example, our ability to maintain Operations System Modification for Intelligent Network Elements certification for our products will affect our ongoing ability to continue to sell our products to Tier 1 CSPs. In addition, our ability to expand our international operations and create international market demand for our products may be limited by regulations or standards adopted by other countries that may require us to redesign our existing products or develop new products suitable for sale in those countries. Although we believe our products are currently in compliance with domestic and international standards and regulations in countries in which we currently sell, we may not be able to design our products to comply with evolving standards and regulations in the future. This ongoing evolution of standards may directly affect our ability to market or sell our products. Further, the cost of complying with the evolving standards and regulations or the failure to obtain timely domestic or foreign regulatory approvals or certification could prevent us from selling our products where these standards or regulations apply, which would result in lower revenue and lost market share.

We may be unable to successfully expand our international operations. In addition, we may be subject to a variety of international risks that could harm our business.

We currently generate most of our sales from customers in North America and have more limited experience marketing, selling and supporting our products and services outside North America or managing the administrative aspects of a worldwide operation. Our ability to expand our international operations is dependent on our ability to create or maintain international market demand for our products. In addition, as we expand our operations internationally, our support organization will face additional challenges including those associated with delivering support, training and documentation in languages other than English. If we invest substantial time and resources to expand our international operations and are unable to do so successfully and in a timely manner, our business, financial condition and results of operations may suffer.

In the course of expanding our international operations and operating overseas, we will be subject to a variety of risks, including:

- differing regulatory requirements, including tax laws, trade laws, data privacy laws, labor regulations, tariffs, export quotas, custom duties or other trade restrictions;
- liability or damage to our reputation resulting from corruption or unethical business practices in some countries;
- exposure to effects of fluctuations in currency exchange rates if, over time, international customer contracts are increasingly denominated in local currencies;
- longer collection periods and difficulties in collecting accounts receivable;
- greater difficulty supporting and localizing our products;
- different or unique competitive pressures as a result of, among other things, the presence of local equipment suppliers;
- challenges inherent in efficiently managing an increased number of employees over large geographic distances, including the need to implement appropriate systems, policies and compensation, benefits and compliance programs;
- limited or unfavorable intellectual property protection;
- risk of change in international political or economic conditions, terrorist attacks or acts of war; and
- restrictions on the repatriation of earnings.

We engage resellers to promote, sell, install and support our products to some customers in North America and internationally. Their failure to do so or our inability to recruit or retain appropriate resellers may reduce our sales and thus harm our business.

We engage some value-added resellers, or VARs, who provide sales and support services for our products. We compete with other telecommunications systems providers for our VARs' business and many of our VARs are free to market competing products. Our use of VARs and other third-party support partners and the associated risks of doing so are likely to increase as

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we expand sales outside of North America. If a VAR promotes a competitor's products to the detriment of our products or otherwise fails to market our products and services effectively, we could lose market share. In addition, the loss of a key VAR or the failure of VARs to provide adequate customer service could have a negative effect on customer satisfaction and could cause harm to our business. If we do not properly recruit and train VARs to sell, install and service our products, our business, financial condition and results of operations may suffer.

The results of the United Kingdom's referendum on withdrawal from the European Union may have a negative effect on global economic conditions, financial markets and our business.

In June 2016, a majority of voters in the United Kingdom elected to withdraw from the European Union in a national referendum, commonly referred to as Brexit. In March 2017, the United Kingdom began the process to exit the European Union, with the terms of the withdrawal subject to a negotiation period anticipated to last at least two years. In January 2019, the EU Parliament rejected a bill proposed by the United Kingdom's prime minister outlining the terms of the United Kingdom's withdrawal, resulting in further uncertainty associated with Brexit. The referendum has created significant uncertainty about the future relationship between the United Kingdom and the European Union, including with respect to the laws and regulations that will apply as the United Kingdom determines which European Union laws to replace or replicate in the event of a withdrawal. The referendum has also given rise to calls for the governments of other European Union member states to consider withdrawal. These developments, or the perception that any of them could occur, have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global market liquidity and restrict the ability of key market participants to operate in certain financial markets. Any of these factors could depress economic activity and restrict our access to capital, or the access to capital of our customers or partners, which could have a material adverse effect on our operations in the United Kingdom, and generally on our business, financial condition and results of operations and reduce the price of our securities.

We may have difficulty evolving and scaling our business and operations to meet customer and market demand, which could result in lower profitability or cause us to fail to execute on our business strategies.

In order to grow our business, we will need to continually evolve and scale our business and operations to meet customer and market demand. Evolving and scaling our business and operations places increased demands on our management as well as our financial and operational resources to effectively:

- manage organizational change;
- manage a larger organization;
- accelerate and/or refocus research and development activities;
- expand our manufacturing, supply chain and distribution capacity;
- increase our sales and marketing efforts;
- broaden our customer-support and services capabilities;
- maintain or increase operational efficiencies;
- scale support operations in a cost-effective manner;
- implement appropriate operational and financial systems; and
- maintain effective financial disclosure controls and procedures.

If we cannot evolve and scale our business and operations effectively, we may not be able to execute our business strategies in a cost-effective manner and our business, financial condition, profitability and results of operations could be adversely affected.

We may not be able to protect our intellectual property, which could impair our ability to compete effectively.

We depend on certain proprietary technology for our success and ability to compete. We rely on intellectual property laws as well as nondisclosure agreements, licensing arrangements and confidentiality provisions to establish and protect our proprietary rights. U.S. patent, copyright and trade secret laws afford us only limited protection, and the laws of some foreign countries do not protect proprietary rights to the same extent. Our pending patent applications may not result in issued patents, and our issued patents may not be enforceable. Any infringement of our proprietary rights could result in significant litigation costs. Further, any failure by us to adequately protect our proprietary rights could result in our competitors offering similar products, resulting in the loss of our competitive advantage and decreased sales.

It may become more difficult to adequately protect our intellectual property as we expand our reliance on third parties for the design, development and/or manufacture of our products. While our contracts with such third parties contain provisions relating to intellectual property rights, indemnification and liability, they may not be adequately enforced. Our third-party providers may also be subject to unauthorized third-party copying or use of our proprietary rights.

Despite our efforts to protect our proprietary rights, attempts may be made to copy or reverse engineer aspects of our products or to obtain and use information that we regard as proprietary. Accordingly, we may be unable to protect our proprietary rights against unauthorized third-party copying or use. Furthermore, policing the unauthorized use of our intellectual property is difficult and costly. Litigation may be necessary in the future to enforce our intellectual property rights, to protect our trade secrets or to determine the validity and scope of the proprietary rights of others. Litigation could result in substantial costs, diversion of resources and harm to our business.

We could become subject to litigation regarding intellectual property rights that could harm our business.

We may be subject to intellectual property infringement claims that are costly to defend and could limit our ability to use some technologies in the future. The risk of such claims could increase as we expand our product portfolio and increasingly rely on more technologies. Third parties may assert patent, copyright, trademark or other intellectual property rights to technologies or rights that are important to our business. Such claims may originate from non-practicing entities, patent holding companies or other adverse patent owners who have no relevant product revenue, and therefore, our own issued and pending patents may provide little or no deterrence to suit from these entities.

We have received in the past and expect that in the future we may receive communications from competitors and other companies alleging that we may be infringing their patents, trade secrets or other intellectual property rights; offering licenses to such intellectual property; threatening litigation or requiring us to act as a third-party witness in litigation. In addition, we have agreed, and may in the future agree, to indemnify our customers for expenses or liabilities resulting from certain claimed infringements of patents, trademarks or copyrights of third parties. Such indemnification may require us to be financially responsible for claims made against our customers, including costs of litigation and damages awarded, which could negatively impact our results of operations. Any claims asserting that our products infringe the proprietary rights of third parties, with or without merit, could be time-consuming, result in costly litigation and divert the efforts of our engineering teams and management. These claims could also result in product shipment delays or require us to modify our products or enter into royalty or licensing agreements. Such royalty or licensing agreements, if required, may not be available to us on acceptable terms, if at all.

Our use of open source software could impose limitations on our ability to commercialize our products.

We incorporate open source software into our products. Although we closely monitor our use of open source software, the terms of many open source software licenses have not been interpreted by the courts, and there is a risk that such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to sell our products. In such event, we could be required to make our proprietary software generally available to third parties, including competitors, at no cost, to seek licenses from third parties in order to continue offering our products, to re-engineer our products or to discontinue the sale of our products in the event re-engineering cannot be accomplished on a timely basis or at all, any of which could adversely affect our revenue and operating expenses.

If we or our ODMs are unable to obtain necessary third-party technology licenses, our ability to develop new products or product enhancements may be impaired.

While our current licenses of third-party technology generally relate to commercially available off-the-shelf technology, we or our ODMs may from time to time be required to license additional technology from third parties to develop new products or product enhancements. These third-party licenses may be unavailable to us or our ODMs on commercially reasonable terms, if at all. The inability to obtain necessary third-party licenses may force us to or our ODMs to obtain substitute technology of lower quality or performance standards or at greater cost or may increase the time-to-market of our products or product enhancements, any of which could harm the competitiveness of our products and result in lost revenue.

Our ability to incur debt and the use of our funds could be limited by borrowing base restrictions and restrictive covenants in our loan and security agreement for our revolving credit facility.

The Loan Agreement we entered into in August 2017 with Silicon Valley Bank, or SVB, provides for a revolving credit facility based on a customary accounts receivable borrowing base, subject to certain exceptions and exclusions, such that borrowings available to us are limited by eligible accounts receivable (as defined in the Loan Agreement).

We are dependent on our existing cash, cash equivalents and borrowings available under our Loan Agreement to provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements for at least the next twelve months. If our financial position deteriorates, our borrowing capacity under the credit facility may be reduced, which would adversely impact our business and growth. In addition, the Loan Agreement includes affirmative and negative covenants and requires that we maintain a specified minimum liquidity ratio and maintenance of Adjusted EBITDA (as defined in the Loan Agreement, as amended). The negative covenants also include, among others, restrictions on our and our subsidiaries' transferring collateral, making changes to the

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nature of our business or the business of the applicable subsidiary, incurring additional indebtedness, engaging in mergers or acquisitions, paying dividends or making other distributions, making investments, engaging in transactions with affiliates, making payments in respect of subordinated debt, creating liens and selling assets, in each case subject to certain exceptions. Failure to maintain these restrictive covenants and requirements can limit the amount of borrowings that are available to us, increase the cost of borrowings under the facility, and/or require us to make immediate payments to reduce borrowings. Since entering into the Loan Agreement, we have had to request waiver or amendment of certain financial covenants in order to avoid a default under the terms of the Loan Agreement and to maintain our ability to borrow under the Loan Agreement. For the month ended November 30, 2017, we were not able to maintain the minimum Adjusted Quick Ratio (as defined in the Loan Agreement, as amended), or AQR, at the level required in the Loan Agreement, which constituted an event of default. Although SVB waived this event of default effective as of November 30, 2017 and, therefore, this default did not terminate our ability to borrow under the Loan Agreement, we were required to pay an amendment fee and amend certain covenants under the Loan Agreement and, in February 2018, we entered into an amendment to the Loan Agreement that, among other things, amended certain affirmative financial covenants, including reductions to the required minimum level of the AQR and the inclusion of an additional financial covenant related to the maintenance of Adjusted EBITDA. In August 2018, we entered into a Second Amendment to the Loan Agreement to, among other things, provide for the extension of the maturity date of the senior secured revolving credit facility to August 7, 2020 and further amend certain financial covenants, including covenants with respect to the AQR and Adjusted EBITDA. In February 2019, we entered into a Third Amendment to the Loan Agreement to reduce the required minimum level of the AQR for the first half of 2019 and the required minimum Adjusted EBITDA for the first fiscal quarter of 2019. Although we were compliant with the financial covenants under the Loan Agreement at March 30, 2019, we have in the past been unable to meet the financial covenants required in the Loan Agreement. Given our current financial position and history of operating losses, it is possible that we may fail to meet the minimum levels required by the financial covenants in a future period, which would constitute an event of default under the Loan Agreement. In particular, if we are unable to generate positive cash flows on a continued basis, we could fall below the minimum AQR requirement, which would constitute an event of default under the Loan Agreement. Under such circumstances we may be forced to immediately repay amounts outstanding under the Loan Agreement. Events beyond our control could have a material adverse impact on our results of operations, financial condition or liquidity, in which case we may not be able to meet our financial covenants. The Loan Agreement covenants may also affect our ability to obtain future financing and to pursue attractive business opportunities and our flexibility in planning for, and reacting to, changes in business conditions. These covenants could place us at a disadvantage compared to some of our competitors, who may have fewer restrictive covenants and may not be required to operate under these restrictions.

Our failure or the failure of our manufacturers to comply with environmental and other legal regulations could adversely impact our results of operations.

The manufacture, assembly and testing of our products may require the use of hazardous materials that are subject to environmental, health and safety regulations, or materials subject to laws restricting the use of conflict minerals. Our failure or the failure of our CMs, ODMs and original equipment manufacturers to comply with any of these requirements could result in regulatory penalties, legal claims or disruption of production. In addition, our failure or the failure of our manufacturers to properly manage the use, transportation, emission, discharge, storage, recycling or disposal of hazardous materials could subject us to increased costs or liabilities. Existing and future environmental regulations and other legal requirements may restrict our use of certain materials to manufacture, assemble and test products. Any of these consequences could adversely impact our results of operations by increasing our expenses and/or requiring us to alter our manufacturing processes.

Regulatory and physical impacts of climate change and other natural events may affect our customers and our contract manufacturers, resulting in adverse effects on our operating results.

As emissions of greenhouse gases continue to alter the composition of the atmosphere, affecting large-scale weather patterns and the global climate, any new regulation of greenhouse gas emissions may result in additional costs to our customers and our contract manufacturers. In addition, the physical impacts of climate change and other natural events, including changes in weather patterns, drought, rising ocean and temperature levels, earthquakes and tsunamis may impact our customers, suppliers and contract manufacturers, and our operations. These potential physical effects may adversely affect our revenue, costs, production and delivery schedules, and cause harm to our results of operations and financial condition.

We have in the past pursued, and may in the future continue to pursue, acquisitions which involve a number of risks and uncertainties. If we are unable to address and resolve these risks and uncertainties successfully, such acquisitions could disrupt our business and result in higher costs than we anticipate.

We acquired Occam in 2011 and Ericsson's fiber access assets in 2012. We may in the future acquire other businesses, products or technologies to expand our product offerings and capabilities, customer base and business. We have evaluated and expect to continue to evaluate a wide array of potential strategic transactions. We have limited experience making such acquisitions or integrating these businesses after such acquisitions. Unanticipated costs to us from these historical transactions as well as both anticipated and unanticipated costs to us related to any future transactions could exceed amounts that are covered by insurance and could have a material adverse impact on our financial condition and results of operations. In addition, the anticipated benefit of any acquisitions may never materialize or the process of integrating acquired businesses, products or technologies may create unforeseen operating difficulties and expenditures.

Some of the areas where we have experienced and may in the future experience acquisition-related risks include:

- expenses and distractions, including diversion of management time related to litigation;
- expenses and distractions related to potential claims resulting from any possible future acquisitions, whether or not they are completed;
- retaining and integrating employees from acquired businesses;
- issuance of dilutive equity securities or incurrence of debt;
- integrating various accounting, management, information, human resource and other systems to permit effective management;
- incurring possible write-offs, impairment charges, contingent liabilities, amortization expense of intangible assets or impairment of goodwill and intangible assets with finite useful lives;
- difficulties integrating and supporting acquired products or technologies;
- unexpected capital expenditure requirements;
- insufficient revenue to offset increased expenses associated with acquisitions; and
- opportunity costs associated with committing capital to such acquisitions.

If our goodwill becomes impaired, we may be required to record a significant charge to our results of operations. We review our goodwill for impairment annually or when events or changes in circumstances indicate the carrying value may not be recoverable, such as a sustained or significant decline in stock price and market capitalization. If the carrying value of goodwill was deemed to be impaired, an impairment loss equal to the amount by which the carrying amount exceeds the estimated fair value would be recognized. Any such impairment could materially and adversely affect our financial condition and results of operations.

Foreign acquisitions would involve risks in addition to those mentioned above, including those related to integration of operations across different cultures and languages, currency risks and the particular economic, political and regulatory risks associated with specific countries. We may not be able to address these risks and uncertainties successfully, or at all, without incurring significant costs, delays or other operating problems.

Our inability to address or anticipate any of these risks and uncertainties could disrupt our business and could have a material impact on our financial condition and results of operations.

Our use of and reliance upon development resources in China may expose us to unanticipated costs or liabilities.

We operate a wholly foreign owned enterprise in Nanjing, China, where a dedicated team of engineers performs product development, quality assurance, cost reduction and other engineering work. Our reliance upon development resources in China may not enable us to achieve meaningful product cost reductions or greater resource efficiency. Further, our development efforts and other operations in China involve significant risks, including:

- difficulty hiring and retaining appropriate engineering resources due to intense competition for such resources and resulting wage inflation;
- the knowledge transfer related to our technology and exposure to misappropriation of intellectual property or confidential information, including information that is proprietary to us, our customers and third parties;
- heightened exposure to changes in the economic, security and political conditions of China;
- fluctuation in currency exchange rates and tax risks associated with international operations;
- development efforts that do not meet our requirements because of language, cultural or other differences associated with international operations, resulting in errors or delays; and
- uncertainty with regards to tariffs imposed by the federal government on products imported from China and future actions the federal government may take with respect to international trade agreements and U.S. tax provisions related to international commerce that could adversely affect our international operations.

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Difficulties resulting from the factors above and other risks related to our operations in China could expose us to increased expense, impair our development efforts, harm our competitive position and damage our reputation.

Our customers are subject to government regulation, and changes in current or future laws or regulations that negatively impact our customers could harm our business.

The FCC has jurisdiction over all of our U.S. customers. FCC regulatory policies that create disincentives for investment in access network infrastructure or impact the competitive environment in which our customers operate may harm our business. For example, future FCC regulation affecting providers of broadband Internet access services could impede the penetration of our customers into certain markets or affect the prices they may charge in such markets. Similarly, changes to regulatory tariff requirements or other regulations relating to pricing or terms of carriage on communication networks could slow the development or expansion of network infrastructures. Consequently, such changes could adversely affect the sale of our products and services. Furthermore, many of our customers are subject to FCC rate regulation of interstate telecommunications services and are recipients of CAF capital incentive payments, which are intended to subsidize broadband and telecommunications services in areas that are expensive to serve. Changes to these programs, rules and regulations that could affect the ability of IOCs to access capital, and which could in turn reduce our revenue opportunities, remain possible.

In addition, many of our customers are subject to state regulation of intrastate telecommunications services, including rates for such services, and may also receive funding from state universal service funds. Changes in rate regulations or universal service funding rules, either at the U.S. federal or state level, could adversely affect our customers’ revenue and capital spending plans. Moreover, various international regulatory bodies have jurisdiction over certain of our non-U.S. customers. Changes in these domestic and international standards, laws and regulations, or judgments in favor of plaintiffs in lawsuits against CSPs based on changed standards, laws and regulations could adversely affect the development of broadband networks and services. This, in turn, could directly or indirectly adversely impact the communications industry in which our customers operate.

Many jurisdictions, including international governments and regulators, are also evaluating, implementing and enforcing regulations relating to cyber security, privacy and data protection, which can affect the market and requirements for networking and communications equipment. To the extent our customers are adversely affected by laws or regulations regarding their business, products or service offerings, our business, financial condition and results of operations would suffer.

We are subject to governmental export and import controls that could subject us to liability or impair our ability to compete in additional international markets.

Our products are subject to U.S. export and trade controls and restrictions. International shipments of certain of our products may require export licenses or are subject to additional requirements for export. In addition, the import laws of other countries may limit our ability to distribute our products, or our customers’ ability to buy and use our products, in those countries. Changes in our products or changes in export and import regulations or duties may create delays in the introduction of our products in international markets, prevent our customers with international operations from deploying our products or, in some cases, prevent the export or import of our products to certain countries altogether. Any change in export or import regulations, duties or related legislation, shift in approach to the enforcement or scope of existing regulations, or change in the countries, persons or technologies targeted by such regulations, could negatively impact our ability to sell, profitably or at all, our products to existing or potential international customers.

If we lose any of our key personnel, or are unable to attract, train and retain qualified personnel, our ability to manage our business and continue our growth would be negatively impacted.

Our success depends, in large part, on the continued contributions of our key management, engineering, sales and marketing personnel, many of whom are highly skilled and would be difficult to replace. None of our senior management or key technical or sales personnel are bound by a written employment contract to remain with us for a specified period. In addition, we do not currently maintain key person life insurance covering our key personnel. If we lose the services of any key personnel, our business, financial condition and results of operations may suffer.

Competition for skilled personnel, particularly those specializing in engineering and sales, is intense. We cannot be certain that we will be successful in attracting and retaining qualified personnel, or that newly hired personnel will function effectively, both individually and as a group. If we are unable to effectively recruit, hire and utilize new employees to align with our company objectives, execution of our business strategy and our ability to react to changing market conditions may be impeded, and our business, financial condition and results of operations may suffer.

Volatility or lack of performance in our stock price may also affect our ability to attract and retain our key personnel. Our executive officers and employees hold a substantial number of shares of our common stock and vested stock options. Employees may be more likely to leave us if the shares they own or the shares underlying their equity awards decline in value, or if the exercise prices of stock options that they hold are significantly above the market price of our common stock. If we are unable to retain our employees, our business, operating results and financial condition will be harmed.

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If we fail in our implementation of our new ERP system platform, we may not be able to effectively transact our business or produce our financial statements on a timely basis and without incurrence of additional costs, which would adversely affect our business, results of operations and cash flows.

We are currently undergoing the migration of our Oracle ERP system to Oracle's cloud service. This migration involves significant complexity, requiring us to move and reconfigure all of our current system processes, transactions, data and controls to a new Oracle platform. Moreover, to date we have experienced substantial delays and higher than planned resource needs in our migration efforts due in part to the complexity, volume and scope of changes involved in the migration. Although we are conducting design validations and user testing that include assessments that our internal financial and accounting controls will be effective post-migration, we may nevertheless experience difficulties in transacting our business due to system challenges, delays or process deficiencies following the initial production use of the system, which could impair our ability to conduct our business or to produce accurate financial statements on a timely basis. If our ability to conduct our business or to produce accurate financial statements on a timely basis is impaired, our business, results of operations and cash flows would be adversely affected.

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our operating results, our ability to operate our business and our stock price.

Ensuring that we have adequate internal financial and accounting controls and procedures in place to produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be re-evaluated frequently. We have in the past discovered, and may in the future discover, areas of our internal financial and accounting controls and procedures that need improvement. The complexity and changes related to our ERP migration described above could exacerbate the risk of deficiencies in process and controls upon which we rely to produce accurate and timely financial statements.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles. Our management does not expect that our internal control over financial reporting will prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within our company will have been detected.

We are required to comply with Section 404 of the Sarbanes-Oxley Act, or SOX, which requires us to expend significant resources in developing the required documentation and testing procedures. We cannot be certain that the actions we have taken and are taking to improve our internal controls over financial reporting will be sufficient to maintain effective internal controls over financial reporting in subsequent reporting periods or that we will be able to implement our planned processes and procedures in a timely manner. In addition, new and revised accounting standards and financial reporting requirements may occur in the future and implementing changes required by new standards, requirements or laws may require a significant expenditure of our management's time, attention and resources which may adversely affect our reported financial results. If we are unable to produce accurate financial statements on a timely basis, investors could lose confidence in the reliability of our financial statements, which could cause the market price of our common stock to decline and make it more difficult for us to finance our operations and growth.

We incur significant costs as a result of operating as a public company, which may adversely affect our operating results and financial condition.

As a public company, we incur significant accounting, legal and other expenses, including costs associated with our public company reporting requirements. We also anticipate that we will continue to incur costs associated with corporate governance requirements, including requirements and rules under SOX and the Dodd-Frank Wall Street Reform and Consumer Protection Act, or Dodd-Frank, among other rules and regulations implemented by the SEC, as well as listing requirements of the New York Stock Exchange, or NYSE. Furthermore, these laws and regulations could make it difficult or costly for us to obtain certain types of insurance, including director and officer liability insurance, and we may be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. The impact of these requirements could also make it difficult for us to attract and retain qualified persons to serve on our Board of Directors, our board committees or as executive officers.

New laws and regulations as well as changes to existing laws and regulations affecting public companies, including the provisions of SOX and the Dodd-Frank Act and rules adopted by the SEC and the NYSE, would likely result in increased costs to us as we respond to their requirements. We continue to invest resources to comply with evolving laws and regulations, and this investment may result in increased general and administrative expense.

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Risks Related to Ownership of Our Common Stock

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

The trading price of our common stock has been, and is likely to continue to be, volatile, which means that it could decline substantially within a short period of time and could fluctuate widely in response to various factors, some of which are beyond our control. These factors include those discussed in the "Risk Factors" section of this Annual Report on Form 10-K and others such as:

- quarterly variations in our results of operations or those of our competitors;
- failure to meet any guidance that we have previously provided regarding our anticipated results;
- changes in earnings estimates or recommendations by securities analysts;
- failure to meet securities analysts' estimates;
- announcements by us or our competitors of new products, significant contracts, commercial relationships, acquisitions or capital commitments;
- developments with respect to intellectual property rights;
- our ability to develop and market new and enhanced products on a timely basis;
- our commencement of, or involvement in, litigation and developments relating to such litigation;
- changes in governmental regulations; and
- a slowdown in the communications industry or the general economy.

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

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

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. If any of the analysts who cover us issue an adverse or misleading opinion regarding our stock, our stock price would likely decline. If several of these analysts cease coverage of our company or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Provisions in our charter documents and under Delaware law could discourage a takeover that stockholders may consider favorable and may lead to entrenchment of our management and Board of Directors.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could have the effect of delaying or preventing changes in control or changes in our management or our Board of Directors. These provisions include:

- a classified Board of Directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our Board of Directors;
- no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- the exclusive right of our Board of Directors to elect a director to fill a vacancy created by the expansion of the Board of Directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our Board of Directors;
- the ability of our Board of Directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;

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- the requirement that a special meeting of stockholders may be called only by the chairman of the Board of Directors, the chief executive officer or the Board of Directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and
- advance notice procedures that stockholders must comply with in order to nominate candidates to our Board of Directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

We are also subject to certain anti-takeover provisions under Delaware law. Under Delaware law, a corporation may not, in general, engage in a business combination with any holder of 15% or more of its capital stock unless the holder has held the stock for three years or, among other things, the Board of Directors has approved the transaction.

We may need additional capital in the future to finance our business.

We may need to raise additional capital to fund operations in the future. Our working capital needs and cash use have continued to increase to support our growth initiatives, and we may need additional capital if our current plans and assumptions change. In addition, the recently implemented U.S. tariffs are expected to have significant negative impact on our cash flows until we are able to mitigate the impact of the tariffs whether through re-engineering of our supply chain or otherwise. Delays in our mitigation plans or unanticipated expenditures associated with these mitigation efforts would further negatively impact our cash flows and result of operations. Failure to maintain certain restrictive covenants and requirements under the Loan Agreement could result in limiting the amount of borrowings that are available to us, increase the cost of borrowings under the credit facility, and/or cause us to make immediate payments to reduce borrowings or result in an event of default. If future financings involve the issuance of equity securities, our then-existing stockholders would suffer dilution. If we raise additional debt financing, we may be subject to restrictive covenants that limit our ability to conduct our business. If we are unable to generate positive operating income and positive cash flows from operations, our liquidity, results of operations and financial condition will be adversely affected. Furthermore, if we are unable to generate sufficient cash flows to support our operational needs, we may need to seek additional sources of liquidity, including borrowings, to support our working capital needs. In addition, we may choose to seek other sources of liquidity even if we believe we have generated sufficient cash flows to support our operational needs. There is no assurance that any other sources of liquidity may be available to us on acceptable terms or at all. If we are unable to generate sufficient cash flows or obtain other sources of liquidity, we will be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, all of which would adversely impact our business and growth.

We do not currently intend to pay dividends on our common stock and, consequently, our stockholders' ability to achieve a return on their investment will depend on appreciation in the price of our common stock.

We do not currently intend to pay any cash dividends on our common stock for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. Additionally, the terms of our credit facility restrict our ability to pay dividends under certain circumstances. Therefore, our stockholders are not likely to receive any dividends on our common stock for the foreseeable future.

ITEM 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

ITEM 3. Defaults Upon Senior Securities

None.

ITEM 4. Mine Safety Disclosures

Not applicable.

ITEM 5. Other Information

None.

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ITEM 6. Exhibits

Exhibit Number	Description
10.1	Third Amendment to Loan and Security Agreement dated February 27, 2019 by and between Silicon Valley Bank and Calix, Inc. (filed as Exhibit 10.1 to Calix's Form 8-K filed with the SEC on March 1, 2019 (File No. 001-34674) and incorporated by reference).
31.1	Certification of Chief Executive Officer of Calix, Inc. Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer of Calix, Inc. Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer and Chief Financial Officer of Calix, Inc. Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

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SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

	CALIX, INC. (Registrant)	
Date: May 1, 2019	By:	/s/ Carl Russo Carl Russo Chief Executive Officer (Principal Executive Officer)
Date: May 1, 2019	By:	/s/ Cory Sindelar Cory Sindelar Chief Financial Officer (Principal Financial Officer)