
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549**

FORM 10-Q

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

For the quarterly period ended September 30, 2019

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

Commission File Number: 001-37824

IMPINJ, INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

400 Fairview Avenue North, Suite 1200, Seattle, Washington
(Address of principal executive offices)

91-2041398
(I.R.S. Employer
Identification No.)

98109
(Zip Code)

Registrant's telephone number, including area code: (206) 517-5300

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

<u>Title of each class</u>	<u>Trading symbol(s)</u>	<u>Name of each exchange on which registered</u>
Common Stock, par value \$0.001 per share	PI	The Nasdaq Global Select Market

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

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

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

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

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

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

As of September 30, 2019, 22,128,284 shares of common stock were outstanding.

IMPINJ, INC.
QUARTERLY REPORT ON FORM 10-Q

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PART I — FINANCIAL INFORMATION
Item 1. Financial Statements (unaudited)

IMPINJ, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except par value, unaudited)

	September 30, 2019	December 31, 2018
Assets:		
Current assets:		
Cash and cash equivalents	\$ 16,931	\$ 17,530
Short-term investments	46,151	38,543
Accounts receivable, net	24,803	18,462
Inventory	36,274	44,725
Prepaid expenses and other current assets	2,259	1,954
Total current assets	126,418	121,214
Property and equipment, net	16,704	19,778
Operating lease right-of-use assets	17,149	—
Other non-current assets	256	196
Goodwill	3,881	3,881
Total assets	\$ 164,408	\$ 145,069
Liabilities and stockholders' equity:		
Current liabilities:		
Accounts payable	\$ 6,074	\$ 4,643
Accrued compensation and employee related benefits	4,908	7,409
Accrued liabilities	2,722	2,887
Current portion of operating lease liabilities	3,292	—
Current portion of restructuring liabilities	94	582
Current portion of long-term debt	3,200	5,930
Current portion of finance lease liabilities	353	523
Current portion of deferred rent	—	402
Current portion of deferred revenue	794	649
Total current liabilities	21,437	23,025
Long-term debt, net of current portion	20,183	17,633
Operating lease liabilities, net of current portion	19,778	—
Finance lease liabilities, net of current portion	18	258
Long-term liabilities — other	302	304
Long-term restructuring liabilities	—	487
Deferred rent, net of current portion	—	5,294
Deferred revenue, net of current portion	154	185
Total liabilities	61,872	47,186
Commitments and contingencies (Note 6)		
Stockholders' equity:		
Preferred stock, \$0.001 par value — 5,000 shares authorized, no shares issued and outstanding at September 30, 2019 and December 31, 2018	—	—
Common stock, \$0.001 par value — 495,000 shares authorized, 22,128 and 21,492 shares issued and outstanding at September 30, 2019 and December 31, 2018, respectively	22	21
Additional paid-in capital	357,541	337,627
Accumulated other comprehensive income (loss)	36	(9)
Accumulated deficit	(255,063)	(239,756)
Total stockholders' equity	102,536	97,883
Total liabilities and stockholders' equity	\$ 164,408	\$ 145,069

See accompanying notes to condensed consolidated financial statements.

IMPINJ, INC.
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share data, unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenue	\$ 40,762	\$ 34,405	\$ 112,015	\$ 88,015
Cost of revenue	20,981	17,857	57,945	46,045
Gross profit	19,781	16,548	54,070	41,970
Operating expenses:				
Research and development	10,344	8,804	27,678	25,170
Sales and marketing	7,842	7,864	24,579	24,746
General and administrative	5,503	6,695	16,653	16,981
Restructuring costs	—	—	—	3,749
Total operating expenses	23,689	23,363	68,910	70,646
Loss from operations	(3,908)	(6,815)	(14,840)	(28,676)
Other income, net	317	204	947	561
Interest expense	(413)	(390)	(1,263)	(970)
Loss before income taxes	(4,004)	(7,001)	(15,156)	(29,085)
Income tax expense	(77)	(69)	(151)	(159)
Net loss	\$ (4,081)	\$ (7,070)	\$ (15,307)	\$ (29,244)
Net loss per share — basic and diluted	\$ (0.19)	\$ (0.33)	\$ (0.70)	\$ (1.37)
Weighted-average shares outstanding — basic and diluted	21,961	21,403	21,738	21,287

See accompanying notes to condensed consolidated financial statements.

IMPINJ, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands, unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Net loss	\$ (4,081)	\$ (7,070)	\$ (15,307)	\$ (29,244)
Other comprehensive income, net of tax:				
Unrealized gain on investments	2	19	45	19
Total other comprehensive income	2	19	45	19
Comprehensive loss	<u>\$ (4,079)</u>	<u>\$ (7,051)</u>	<u>\$ (15,262)</u>	<u>\$ (29,225)</u>

See accompanying notes to condensed consolidated financial statements.

IMPINJ, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands, unaudited)

	Nine Months Ended September 30,	
	2019	2018
Operating activities:		
Net loss	\$ (15,307)	\$ (29,244)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Depreciation	3,637	3,394
Stock-based compensation	11,813	8,013
Non-cash restructuring benefit	—	(454)
Accretion of discount or amortization of premium on short-term investments	(464)	(247)
Amortization of debt issuance costs	51	57
Changes in operating assets and liabilities:		
Accounts receivable	(6,341)	2,656
Inventory	8,451	(2,112)
Prepaid expenses and other assets	(222)	391
Deferred revenue	114	(288)
Deferred rent	—	(176)
Accounts payable	1,508	(774)
Accrued compensation and employee related benefits	(2,440)	(720)
Operating lease right-of-use assets	1,505	—
Operating lease liabilities	(2,255)	—
Accrued liabilities and other liabilities	164	1,223
Restructuring liabilities	—	1,576
Net cash provided by (used in) operating activities	214	(16,705)
Investing activities:		
Purchases of investments	(59,036)	(33,397)
Proceeds from maturities of investments	51,794	35,402
Purchases of property and equipment	(971)	(3,051)
Net cash used in investing activities	(8,213)	(1,046)
Financing activities:		
Principal payments on finance lease obligations	(410)	(717)
Payments on term and equipment loans	(4,222)	(2,230)
Proceeds from term loans, net of debt issuance costs	3,991	16,379
Proceeds from exercise of stock options and employee stock purchase plan	8,041	2,627
Net cash provided by financing activities	7,400	16,059
Net decrease in cash and cash equivalents	(599)	(1,692)
Cash and cash equivalents		
Beginning of period	17,530	19,285
End of period	\$ 16,931	\$ 17,593
Supplemental cash flow information:		
Purchases of property and equipment not yet paid	\$ 105	\$ 3,464

See accompanying notes to condensed consolidated financial statements.

IMPINJ, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(in thousands, unaudited)

	Common Stock		Additional	Accumulated	Accumulated	Total
	Shares	Amount	Paid-in	Deficit	Other Comprehensive Income (Loss)	Stockholders' Equity
Balance at December 31, 2018	21,492	\$ 21	\$ 337,627	\$ (239,756)	\$ (9)	\$ 97,883
Issuance of common stock	135	1	1,862	—	—	1,863
Stock-based compensation	—	—	3,477	—	—	3,477
Net loss	—	—	—	(7,068)	—	(7,068)
Other comprehensive income	—	—	—	—	16	16
Balance at March 31, 2019	21,627	22	342,966	(246,824)	7	96,171
Issuance of common stock	134	—	1,049	—	—	1,049
Stock-based compensation	—	—	3,543	—	—	3,543
Net loss	—	—	—	(4,158)	—	(4,158)
Other comprehensive income	—	—	—	—	27	27
Balance at June 30, 2019	21,761	22	347,558	(250,982)	34	96,632
Issuance of common stock	367	—	5,190	—	—	5,190
Stock-based compensation	—	—	4,793	—	—	4,793
Net loss	—	—	—	(4,081)	—	(4,081)
Other comprehensive income	—	—	—	—	2	2
Balance at September 30, 2019	22,128	\$ 22	\$ 357,541	\$ (255,063)	\$ 36	\$ 102,536

	Common Stock		Additional	Accumulated	Accumulated	Total
	Shares	Amount	Paid-in	Deficit	Other Comprehensive Loss	Stockholders' Equity
Balance at December 31, 2017	20,973	\$ 21	\$ 323,482	\$ (204,525)	\$ (36)	\$ 118,942
Issuance of common stock	359	—	2,015	—	—	2,015
Stock-based compensation	—	—	2,065	—	—	2,065
Net loss	—	—	—	(14,442)	—	(14,442)
Other comprehensive loss	—	—	—	—	(20)	(20)
Balance at March 31, 2018	21,332	21	327,562	(218,967)	(56)	108,560
Issuance of common stock	63	—	266	—	—	266
Stock-based compensation	—	—	2,613	—	—	2,613
Net loss	—	—	—	(7,732)	—	(7,732)
Other comprehensive income	—	—	—	—	20	20
Balance at June 30, 2018	21,395	21	330,441	(226,699)	(36)	103,727
Issuance of common stock	87	—	452	—	—	452
Stock-based compensation	—	—	3,335	—	—	3,335
Net loss	—	—	—	(7,070)	—	(7,070)
Other comprehensive income	—	—	—	—	19	19
Balance at September 30, 2018	21,482	\$ 21	\$ 334,228	\$ (233,769)	\$ (17)	\$ 100,463

See accompanying notes to condensed consolidated financial statements.

IMPINJ, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(unaudited)

Note 1. Description of Business

Impinj, Inc. ("we", "us" or "our"), a Delaware corporation, is headquartered in Seattle, Washington. We enable wireless connectivity for everyday items, delivering each item's unique identity, location and authenticity to business and consumer applications. Our platform spans endpoints, connectivity and software and provides wireless item connectivity and information delivery. We derive revenue from selling endpoint integrated circuits, or ICs, reader ICs, modules, readers, gateways and software as well as from development, service and license agreements. Our integrated platform connects billions of everyday items to applications, delivering real-time information to businesses about items they create, manage, transport and sell.

Note 2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying condensed consolidated financial statements include Impinj, Inc. and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation. These condensed consolidated financial statements have been prepared in conformity with U.S. generally accepted accounting principles, or GAAP, and applicable rules and regulations of the Securities and Exchange Commission, or SEC, regarding interim financial reporting. Certain information and note disclosures normally included in the financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to such rules and regulations. Accordingly, these interim condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and accompanying notes as of and for the year ended December 31, 2018 included in Impinj, Inc.'s Annual Report on Form 10-K, which was filed with the SEC on February 28, 2019. The condensed consolidated balance sheet as of December 31, 2018, included herein, was derived from the audited consolidated financial statements of Impinj, Inc.

The unaudited condensed consolidated interim financial statements, in the opinion of management, reflect all adjustments, consisting of normal recurring adjustments, necessary to state fairly our financial position, results of operations, and our cash flows for the periods presented. Interim results are not necessarily indicative of the results for a full year or for any other future period.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make certain estimates, judgments and assumptions that affect the reported amounts of assets and liabilities and the related disclosures at the date of the financial statements, as well as the reported amounts of revenue and expenses during the periods presented. On an ongoing basis, we evaluate our estimates, including those related to revenue recognition, reserve for sales returns and incentives, inventory excess and obsolescence, recoverability of long-lived assets and deferred tax assets and stock-based compensation, among others. To the extent there are material differences between these estimates, judgments, or assumptions and actual results, our financial statements will be affected.

Leases

We determine whether an arrangement is or contains a lease at inception. Right-of-use, or ROU, assets represent our right to use an identified asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. We use our incremental borrowing rate in determining the present value of lease payments as our operating leases do not provide an implicit rate. Our incremental borrowing rate is based on a credit-adjusted risk-free rate, which best approximates a secured rate over a similar term of lease. Lease expense for lease payments is recognized on a straight-line basis over the lease term. Finance lease ROU assets are included in property and equipment, net in our condensed consolidated balance sheets.

We have various non-cancellable operating lease agreements for office, warehouse and research and development space in the U.S., China, Thailand and Malaysia, with expiration dates from 2019 to 2026. Certain of these arrangements have free or escalating rent payment provisions and optional renewal and termination clauses that are factored into our determination of lease payments when appropriate. These lease agreements typically include lease and non-lease components and are generally accounted for as a single lease component.

Leases with an initial term of 12 months or less are not recorded on our balance sheet; we recognize lease expense for these leases on a straight-line basis over the lease term.

Recently Adopted Accounting Standards

In February 2016, the Financial Accounting Standards Board, or FASB, issued guidance on leases. This standard requires the recognition of a right-of-use asset and lease liability on the balance sheet for all leases. It also requires more detailed disclosures to enable users of financial statements to understand the amount, timing, and uncertainty of cash flows arising from leases. This standard is effective for interim and annual reporting periods beginning after December 15, 2018.

We adopted this standard on January 1, 2019 using the effective-date modified retrospective transition method and elected the available practical expedients permitted under the transition method, allowing us to carryforward our historical assessments of (1) whether contracts are or contain leases, (2) lease classification, and (3) initial direct costs. Upon adoption of this standard, we recorded net operating lease ROU assets and lease liabilities of \$18.7 million and \$25.3 million, respectively, as of January 1, 2019. Net restructuring liabilities related to cease-use costs and net deferred rent were netted against the operating lease ROU assets upon adoption of this guidance. Our accounting for finance leases remained substantially unchanged. The condensed consolidated financial statements for the three and nine months ended September 30, 2019 and as of September 30, 2019 are presented under the new standard, while comparative prior periods presented are not adjusted and continue to be reported in accordance with our historical accounting policy. The adoption of this guidance did not impact our results of operations.

In June 2018, the FASB issued guidance to improve nonemployee share-based payment accounting that requires companies to account for share-based payments granted to nonemployees similar to share-based payments granted to employees. This guidance is effective for fiscal years beginning after December 15, 2018, including the interim periods within those fiscal years. We adopted this standard on January 1, 2019 and the adoption of this guidance did not impact our financial positions, results of operations or cash flows.

In August 2018, the FASB issued guidance to align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. This guidance is effective for fiscal years beginning after December 15, 2019, including the interim periods within those fiscal years. Early adoption of this guidance is permitted. We early adopted this guidance prospectively on January 1, 2019 and the adoption of this guidance did not impact our financial positions, results of operations or cash flows.

Recently Issued Accounting Standards Not Yet Adopted

In June 2016, the FASB issued guidance on the measurement of credit losses on financial instruments. This guidance requires the measurement and recognition of expected credit losses for financial assets held at amortized cost. This guidance is effective for interim and annual reporting periods beginning after December 15, 2019, and early adoption is permitted. We expect to adopt this guidance on January 1, 2020. The adoption of this guidance requires a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective. While we continue to assess all potential impacts of this new standard, we do not expect the adoption of this guidance to have a material impact on our financial position, results of operations or cash flows.

Other recent accounting pronouncements issued by the FASB (including its Emerging Issues Task Force), the American Institute of Certified Public Accountants, and the Securities and Exchange Commission did not have, or are not expected to have, a material impact on our present or future consolidated financial statements.

Note 3. Fair Value Measurements

Accounting standards define fair value as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market in an orderly transaction between market participants on the measurement date. The standards also establish a fair value hierarchy, which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. There are three levels of inputs that may be used to measure fair value:

- Level 1 — Quoted prices in active markets for identical assets or liabilities.
- Level 2 — Assets and liabilities valued based on observable market data for similar instruments, such as quoted prices for similar assets or liabilities.
- Level 3 — Unobservable inputs that are supported by little or no market activity; instruments valued based on the best available data, some of which is internally developed, and considers risk premiums that a market participant would require.

We applied the following methods and assumptions in estimating our fair value measurements:

Cash Equivalents — Cash equivalents consist of highly liquid investments, which include money market funds with original maturities of less than three months at the acquisition date. The fair value measurement of these assets is based on quoted market prices in active markets and these assets are recorded at fair value.

Investments — Our investments consist of fixed income securities, which include U.S. government agency securities, treasury bills, commercial paper, money market funds and corporate notes and bonds. The fair value measurement of these assets is based on observable market-based inputs or inputs that are derived principally from or corroborated by observable market data by correlation or other means.

Long-term Debt — The fair values of our long-term debt approximates carrying value based on the borrowing rates currently available to us for loans with similar terms using Level 2 inputs.

The following table presents the balances of assets measured at fair value on a recurring basis, by level within the fair value hierarchy, as of the dates presented (in thousands):

	September 30, 2019			December 31, 2018		
	Level 1	Level 2	Total	Level 1	Level 2	Total
Cash equivalents:						
Money market funds	\$ 6,393	\$ —	\$ 6,393	\$ 11,896	\$ —	\$ 11,896
Total cash equivalents	6,393	—	6,393	11,896	—	11,896
Short-term investments:						
U.S. government agency securities	—	29,748	29,748	—	7,482	7,482
Corporate notes and bonds	—	10,436	10,436	—	3,736	3,736
Commercial paper	—	5,967	5,967	—	9,943	9,943
Treasury bills	—	—	—	—	17,382	17,382
Total short-term investments	—	46,151	46,151	—	38,543	38,543
Total	\$ 6,393	\$ 46,151	\$ 52,544	\$ 11,896	\$ 38,543	\$ 50,439

We did not have any Level 3 assets as of September 30, 2019 or December 31, 2018. There were no liabilities measured at fair value as of September 30, 2019 or December 31, 2018. The gross unrealized gains or losses on cash equivalents and short-term investments as of September 30, 2019 or December 31, 2018 were not material.

Note 4. Inventory

The following table presents the detail of inventories as of the dates presented (in thousands):

	September 30, 2019	December 31, 2018
Raw materials	\$ 5,681	\$ 3,858
Work-in-process	7,190	13,671
Finished goods	23,403	27,196
Total inventory	\$ 36,274	\$ 44,725

Note 5. Stock-Based Awards

Stock Options

The following table summarizes stock options activity for the nine months ended September 30, 2019 (in thousands):

	Number of Shares
Outstanding at December 31, 2018	3,603
Granted	558
Exercised	(424)
Forfeited or expired	(362)
Outstanding at September 30, 2019	3,375
Vested and exercisable at September 30, 2019	1,306

Restricted Stock Units

The following table summarizes activity for restricted stock units, or RSUs, and RSUs with performance conditions, or PSUs, for the nine months ended September 30, 2019 (in thousands):

	Number of Shares	
	RSUs	PSUs
Outstanding at December 31, 2018	32	—
Granted	462	248
Vested	(40)	—
Forfeited	(4)	(12)
Outstanding at September 30, 2019	450	236

PSUs granted during the nine months ended September 30, 2019 were primarily related to 234,000 PSUs associated with a PSU bonus program that replaced what has historically been our annual cash-bonus program for our senior executives and other bonus-eligible employees. The number of PSUs that ultimately vest will depend on the extent to which we achieve certain 2019 financial metrics: 134,000 PSUs will vest at 100% achievement of these financial metrics and 234,000 PSUs at 175% achievement. We record compensation expense each period based on our estimate of the most probable number of PSUs that will vest and recognize such expense over the related service period. Stock-based compensation expense recognized for the PSUs was \$600,000 and \$1.2 million for the three and nine months ended September 30, 2019, respectively.

Stock-Based Compensation Expense

The following table presents the effects of stock-based compensation in our condensed consolidated statements of operations for the periods presented (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Cost of revenue	\$ 192	\$ 144	\$ 495	\$ 325
Research and development expense	1,717	1,039	4,028	2,620
Sales and marketing expense	1,622	1,188	4,028	2,876
General and administrative expense	1,262	964	3,262	2,192
Total stock-based compensation expense	\$ 4,793	\$ 3,335	\$ 11,813	\$ 8,013

Note 6. Commitments and Contingencies

For information on our commitments and contingencies, see Part II, Item 8 (Financial Statements and Supplementary Data, Note 10. Commitments and Contingencies) of our Annual Report on Form 10-K for the year ended December 31, 2018. There have been no material changes to our commitments and contingencies, outside of the ordinary course of our business, as previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2018, except for “Obligations with Third-Parties” and “Litigation” as discussed below.

Obligations with Third Parties

We have certain non-cancelable obligations, which include obligations with third-party manufacturers who manufacture our products. We are committed to purchase \$12.4 million of inventory as of September 30, 2019.

Litigation

From time to time, we are subject to various legal proceedings or claims that arise in the ordinary course of business. We accrue a liability when management believes that it is both probable that a liability has been incurred and the amount of loss can be reasonably estimated. As of September 30, 2019 and December 31, 2018, we have not recorded any such liabilities. The following is a description of our significant legal proceedings. Although we believe that resolving such claims, individually or in aggregate, will not have a material adverse impact on our financial statements, these matters are subject to inherent uncertainties.

Federal Securities Class Actions

On August 7, 2018, a class action complaint for violation of the federal securities laws was filed in the U.S. District Court for the Central District of California against us, our chief executive officer and chief operating officer. Captioned *Schultz v. Impinj, Inc., et al*, the complaint, purportedly brought on behalf of all purchasers of our common stock from May 7, 2018 through and including August 2, 2018, asserted claims that our quarterly statement filed on Form 10-Q for the first quarter of 2018 and a concurrent press release made false or misleading statements about our business prospects and financial condition. The complaint sought monetary damages, costs and expenses. On October 3, 2018, the plaintiff voluntarily dismissed this complaint.

On August 27, 2018, a second-class action complaint for violation of the federal securities laws was filed in the U.S. District Court for the Western District of Washington against us, our chief executive officer, chief operating officer and former chief financial officer. Captioned *Montemarano v. Impinj, Inc., et al.*, the complaint, purportedly brought on behalf of all purchasers of our common stock from May 4, 2017 through and including August 2, 2018, asserts claims that we made false or misleading statements in our financial statements, press releases and conference calls during the purported class period in violation of Section 10(b) of the Securities Exchange Act of 1934, as amended, or the Securities Exchange Act. The complaint seeks monetary damages, costs and expenses.

On October 2, 2018, a third-class action complaint for violation of the federal securities laws was filed in the U.S. District Court for the Western District of Washington against us, our chief executive officer, chief operating officer and former chief financial officer. Captioned *Employees' Retirement System of the City of Baton Rouge and Parish of East Baton Rouge v. Impinj, Inc., et al.*, the complaint, purportedly brought on behalf of all purchasers of our common stock from November 3, 2016 through and including February 15, 2018, asserts claims that we made false or misleading statements about customer demand for our products and inventory in SEC filings, press releases and conference calls in violation of Section 10(b) of the Securities Exchange Act. The complaint seeks monetary damages, costs and expenses.

On January 14, 2019, the U.S. District Court for the Western District of Washington consolidated the *Montemarano* and *Baton Rouge* actions and appointed the Employees' Retirement System of the City of Baton Rouge and Parish of East Baton Rouge as lead plaintiff. On February 13, 2019, lead plaintiff filed a consolidated amended complaint. The consolidated amended complaint alleges that from July 21, 2016 through February 15, 2018, we made false or misleading statements about customer demand and the capability of our products and platform in violation of Section 10(b) of the Securities Exchange Act.

On March 19, 2019, we filed a motion to dismiss the consolidated amended complaint, and on October 4, 2019, the court entered an order granting in part and denying in part the motion. The court dismissed the Section 10(b) claim against our President and COO, dismissed product capability-related allegations against our former CFO, and dismissed allegations that defendants made false or misleading statements concerning increasing demand prior to the first quarter of 2017. The court denied the motion as to all other claims and defendants. A trial date has been set for February 1, 2021.

New York State Securities Class Action

On January 31, 2019, a fourth-class action complaint for violation of the federal securities laws was filed in the Supreme Court of the State of New York for the County of New York against us, our chief executive officer, chief operating officer, former chief financial officer, members of our board of directors and the underwriters of our July 2016 initial public stock offering, or IPO, and December 2016 secondary public offering, or SPO. Captioned *Plymouth County Retirement System v. Impinj, Inc., et al.*, the complaint, purportedly brought on behalf of purchasers of our stock pursuant to or traceable to our IPO and SPO, alleges that we made false or misleading statements in the registration statements and prospectuses in those offerings concerning demand for our products and inventory in violation of Section 11 of the Securities Act of 1933. On April 9, 2019, the New York Supreme Court entered an order staying the action and requiring the parties to update the court every 90 days as to the status of the pending federal securities class actions discussed above.

Shareholder Derivative Actions

On October 26, 2018, two shareholder derivative actions were filed in the U.S. District Court for the District of Delaware against our chief executive officer, chief operating officer, former chief financial officer and certain of our directors. We are a nominal defendant. On November 8, 2018, a third shareholder derivative action was filed in this same court against the same defendants. Captioned *Weiss v. Diorio, et al.*, *Fotouhi v. Diorio, et al.*, and *De la Fuente v. Diorio, et al.*, the derivative complaints, purportedly brought on behalf of us, allege that the defendants breached their fiduciary duties to us and allegedly made false or misleading statements and omissions of material fact in violation of Section 14(a) of the Securities Exchange Act regarding our business and operations. The derivative actions include claims for, among other things, unspecified damages in favor of us, corporate actions to purportedly improve our corporate governance, and an award of costs and expenses to the derivative plaintiffs, including attorneys' fees. On January 28, 2019, the Delaware federal court entered a stipulated order that stayed these derivative actions until resolution of the pending federal securities class actions described above.

Patent Infringement Claims and Counterclaims

On June 6, 2019, we filed a patent infringement lawsuit against NXP USA, Inc., a Delaware corporation and subsidiary of NXP Semiconductors N.V., or NXP, in the U.S. District Court for the Northern District of California. Our complaint alleges that certain NXP integrated circuit products infringed and continue to infringe numerous U.S. patents owned by us. We are seeking, among other things, past damages, including lost profits, and no less than a reasonable royalty; enhanced damages for willful infringement; and reasonable attorneys' fees and costs for infringement of each of the asserted patents. We are also seeking an injunction against NXP making, selling, using, offering for sale or importing the RAIN RFID integrated circuit product NXP introduced in 2017. Defendants responded to our complaint on September 30, 2019 citing numerous defenses including denying infringement, claiming our asserted patents are invalid, and that the infringed patents were licensed on a royalty-free basis under Impinj's commitments to GS1 EPCglobal.

On October 4, 2019, NXP USA, Inc. and NXP, filed a patent infringement lawsuit against us in the U.S. District Court for the District of Delaware. The complaint alleges that certain of our products infringed and continue to infringe numerous U.S. patents owned by NXP or NXP USA, Inc. The plaintiffs are seeking, among other things, past damages adequate to compensate them for our alleged infringement of each of the patents-in-suit, and reasonable attorneys' fees and costs. They are also seeking an injunction against us, enjoining continuing acts of infringement of the patents-in-suit.

Note 7. Debt Facilities

On March 5, 2018, we amended our senior credit facility to, among other things, extend the maturity date of the \$25.0 million revolving credit facility, with a \$5.0 million letter of credit sub-facility, to March 5, 2020, and provide for a \$20.0 million term loan. We incurred \$9.0 million in term loan borrowings to refinance \$7.9 million of term loan borrowings and \$1.1 million of equipment loans and have \$11.0 million of term loan borrowings available for general corporate purposes. On August 17, 2018, we amended our senior credit facility, to provide for a \$4.0 million equipment advance which we used solely to purchase equipment.

On April 26, 2019, we amended our senior credit facility to, among other things, extend the maturity date of the \$25.0 million revolving credit facility, with a \$5.0 million letter of credit sub-facility, to May 1, 2021 and refinance the existing term loan and equipment advance with a new \$23.5 million term loan. The term loan will amortize over 36 months, beginning on May 1, 2020, following an initial 12-month interest-only period, and mature on April 1, 2023. We may prepay the term loan at any time, subject to a prepayment fee equal to 2.0% of the outstanding principal amount if prepaid on or before April 26, 2020, or 1.0% of the outstanding principal amount if prepaid after April 26, 2020, but on or before April 26, 2021. There were no changes to the term loan interest rates or financial covenants as a result of this amendment.

The loans accrue interest, at our option, at (1) a LIBOR rate determined in accordance with the senior credit facility, plus a margin ranging from 2.75% to 3.50%, or (2) a prime rate determined in accordance with the senior credit facility, plus a margin ranging from 0.00% to 0.75%. The margin percentage is determined based upon whether the outstanding borrowing is a term loan or revolving loan and our adjusted EBITDA for the preceding 12-month period. Interest is due and payable in arrears monthly for prime rate loans and at the end of an interest period for LIBOR rate loans.

The senior credit facility includes financial and operating covenants, including a minimum liquidity ratio and maximum adjusted EBITDA loss threshold that both apply in the event we do not maintain a minimum liquidity threshold, which are set forth in detail in the credit facility agreement. We were in compliance with the covenants under our senior credit facility as of September 30, 2019 and December 31, 2018. Our obligations under the senior credit facility are collateralized by substantially all our assets other than intellectual property.

At September 30, 2019, \$23.5 million of term loan borrowings were outstanding, excluding unamortized debt issuance costs of \$117,000, and no revolver borrowings were outstanding. Term loan interest rates were 5.75%. The following table presents the scheduled principal maturities as of September 30, 2019 (in thousands):

2019	\$	—
2020		5,222
2021		7,833
2022		7,833
2023		2,612
Total	\$	23,500

Note 8. Leases

The following table presents the components of lease expense in our condensed consolidated statements of operations for the periods presented (in thousands):

	Three Months Ended September 30,	Nine Months Ended September 30,
	2019	2019
Operating lease costs(a)		
Single lease costs	\$ 1,039	\$ 3,141
Variable lease costs	410	1,310
Sublease income(b):		
Single sublease income	(329)	(986)
Variable sublease income	(139)	(417)
Total operating lease costs	\$ 981	\$ 3,048
Finance lease costs:		
Amortization of right-of-use assets	\$ 106	\$ 328
Interest on lease liabilities	11	43
Total finance lease costs	\$ 117	\$ 371

(a) Includes short-term lease costs, which are immaterial.

(b) Sublease income is related to unused office space that was sublet as part of the restructuring in fiscal 2018 where we continue to have the primary obligations.

The following table presents supplemental cash flow information related to leases for the periods presented (in thousands):

	Nine Months Ended September 30,
	2019
Cash paid for amounts included in the measurement of lease liabilities	
Operating cash flows used in operating leases	\$ 3,457
Operating cash flows used in finance leases	43
Financing cash flows used in finance leases	410

The following table presents weighted-average remaining lease term and weighted-average discount rate related to leases as of September 30, 2019:

	September 30, 2019
Weighted-average remaining lease term (years)	
Operating leases	6.3
Finance leases	1.0
Weighted-average discount rate	
Operating leases	6.8%
Finance leases	10.3%

The following table presents future lease payments under operating and finance leases as of September 30, 2019 (in thousands):

	Operating Leases			Finance Leases
	Lease Payments	Sublease Income	Net	Lease Payments
2019	\$ 1,160	\$ (339)	\$ 821	\$ 120
2020	4,755	(1,373)	3,382	270
2021	4,790	(1,414)	3,376	—
2022	4,650	(1,457)	3,193	—
2023	3,263	(123)	3,140	—
Thereafter	9,947	-	9,947	—
Total lease payments	\$ 28,565	\$ (4,706)	\$ 23,859	\$ 390
Less: Imputed interest	(5,495)			(19)
Present value of lease liabilities	23,070			371
Less: Current portion of lease liabilities	(3,292)			(353)
Lease liabilities, net of current portion	\$ 19,778			\$ 18

The following table presents future minimum lease payments under operating and capital leases in accordance with Topic 840 as of December 31, 2018 (in thousands):

	Operating Leases	Capital Leases
2019	\$ 3,573	\$ 575
2020	3,340	270
2021	3,305	—
2022	3,193	—
2023	3,140	—
Thereafter	9,947	—
Total minimum lease payments	\$ 26,498	\$ 845
Less: Portion representing interest		(64)
Present value of capital lease obligations		781
Less: Current portion of capital lease obligations		(523)
Capital lease obligations net of current portion		\$ 258

Note 9. Net Loss Per Share

The following table provides a reconciliation of the numerator and denominator used in computing basic and diluted net loss per share for the periods presented (in thousands, except per share amounts):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Numerator:				
Net loss	\$ (4,081)	\$ (7,070)	\$ (15,307)	\$ (29,244)
Denominator:				
Weighted-average shares outstanding — basic and diluted	21,961	21,403	21,738	21,287
Net loss per share — basic and diluted	\$ (0.19)	\$ (0.33)	\$ (0.70)	\$ (1.37)

The following table presents the outstanding options and restricted stock units and unvested shares excluded from the computation of diluted net loss per share as of the dates presented because their effect would have been antidilutive (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Stock options and restricted stock units	4,037	3,404	3,832	3,131
Unvested shares of common stock subject to repurchase	1	17	4	23

Note 10. Restructuring

On February 13, 2018, we initiated a restructuring plan to align our strategic and financial objectives and optimize our resources for long-term growth, including a reduction-in-force affecting approximately 9% of our employees, subleasing unused office space and closing some remote offices. The restructuring was substantially complete as of June 30, 2018. As a result of the restructuring, we recorded a restructuring charge of \$3.7 million for the nine months ended September 30, 2018.

The following table presents the changes in restructuring liabilities for the period presented (in thousands):

	Employee Termination Benefits	Cease-Use Costs	Total
Balance at December 31, 2018	\$ 94	\$ 975	\$ 1,069
Effect of the new lease standard adoption ⁽¹⁾	—	(975)	(975)
Balance at September 30, 2019	\$ 94	\$ —	\$ 94

⁽¹⁾ Upon adoption of the new lease standard on January 1, 2019, restructuring liabilities related to cease-use costs were netted against the operating lease right-of-use assets.

Note 11. Segment Information

We have one operating and reportable segment which has been identified based on how our chief operating decision maker manages our business, makes operating decisions and evaluates operating performance. The chief executive officer acts as the chief operating decision maker and reviews financial and operational information on a consolidated reporting unit. There are no segment managers who are held accountable for operations, operating results or plans for levels or components below the consolidated reporting unit.

The chief executive officer reviews information about our revenue categories, which are endpoint ICs and systems. Systems revenue includes sales of reader ICs, modules, readers, gateways and software. The following table presents our revenue by category for the periods presented (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenue:				
Endpoint ICs	\$ 26,370	\$ 23,711	\$ 71,919	\$ 63,142
Systems	14,392	10,694	40,096	24,873
Total revenue	<u>\$ 40,762</u>	<u>\$ 34,405</u>	<u>\$ 112,015</u>	<u>\$ 88,015</u>

Note 12. Deferred Revenue

Deferred revenue, consisting of individually immaterial amounts for extended warranty, enhanced maintenance and advanced payments on non-recurring engineering services contracts, represents revenue that has not yet been recognized.

The following table presents the changes in deferred revenue for the periods presented (in thousands):

	Nine Months Ended September 30,	
	2019	2018
Balance at beginning of period	\$ 834	\$ 1,215
Deferral of revenue	544	559
Recognition of deferred revenue	(430)	(847)
Balance at end of period	<u>\$ 948</u>	<u>\$ 927</u>

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

This report contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Statements containing words such as “may,” “believe,” “anticipate,” “expect,” “intend,” “plan,” “project,” “projections,” “business outlook,” “estimate,” or similar expressions constitute forward-looking statements. You should read these statements carefully because they discuss future expectations, contain projections of future results of operations or financial condition or state other “forward-looking” information. These statements relate to our future plans, objectives, expectations, intentions and financial performance and the assumptions that underlie these statements. They include, but are not limited to, statements about:

- *our market opportunity; the adoption of RAIN RFID technology and solutions; our ability to compete effectively against competitors and competing technologies; our market share and technology leadership; and the implementation of our business model, strategic plans and product development plans;*
- *our future financial performance, including our average selling prices, gross margins, liquidity and capital resources, as well as future macroeconomic conditions;*
- *the performance of third parties on which we rely for product manufacturing, assembly and testing; and our relationship with third parties on which we rely for product distribution, sales, integration and development; our ability to adequately protect our intellectual property;*
- *the regulatory regime for our products and services; and*
- *our leadership of standards-setting processes.*

Our actual results may differ materially from those contained in or implied by any forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this report, including those factors discussed in Part II, Item 1A (Risk Factors).

In light of the significant uncertainties and risks inherent in these forward-looking statements, you should not regard these statements as a representation or warranty by us or anyone else that we will achieve our objectives and plans in any specified time frame, or at all, or as predictions of future events. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

Our Business

Our vision is digital life for everyday items. Our mission is to deliver a platform that powers item-to-cloud connectivity, enabling developers to innovate Internet-of-Things, or IoT, applications on our platform. We are driving a future in which everyday physical items have digital counterparts, or digital twins, in the cloud, and in which businesses and people engage with trillions of those everyday physical items via their digital twins. These cloud-based digital twins will store an individual item's ownership, history and links, and provide businesses and people ubiquitous access to them. We believe the item-to-cloud connectivity we will deliver will enhance businesses efficiencies and commerce and, ultimately, improve peoples' lives.

Today, our platform connects individual items, capturing and delivering data about each item from manufacturing, through distribution to sale. We and our channel partners connect items via a miniature radio chip embedded in the item or in its packaging, reading and delivering the item's identity, location and authenticity to business and consumer applications. To date, we have enabled connectivity to more than 30 billion items, enabling retailers, hospitals, airlines, automotive manufacturers, supply chain and logistics and businesses in many other industries to derive timely business value from those connected items.

Our platform comprises endpoint ICs, connectivity and software that together deliver item data to business applications. We link the layers of our platform to deliver advanced capabilities and performance that surpasses mix-and-match solutions built from competitor products. Within each layer we sell one or more product families.

Factors Affecting Our Performance

Investing in Growth

We have invested and plan to continue investing in research and development to enhance and extend our platform, including enhancing existing platform products and introducing new platform products. We plan to enhance our system software, including its deployment models and functionalities, and our fixed readers and gateways and leverage them for platform deployments in retail, healthcare, supply chain and logistics and other industries. We also plan to develop next-generation reader and endpoint ICs. We may enter into arrangements with customers, vendors and channel partners to fund a certain portion of these research and development initiatives. If we are unsuccessful in attracting such funding, our operating results and product time-to-market may be adversely affected.

Our sales and marketing investments seek to deepen product integration with our software partners to accelerate the development and adoption of solutions based on our platform. Many of these investments will occur in advance of us experiencing any direct benefit from them and may affect our profitability in future periods.

Market Adoption

Our financial performance generally depends upon the rate, scope and depth of end-user adoption of our products in multiple industries, including the retail industry which is our largest market. In 2015 and 2016, some major retailers and brand owners initiated new deployments that significantly increased our endpoint IC sales. In 2016, our endpoint IC sales exceeded both our expectations and those of our industry's analysts, which resulted in longer lead times. As a result of those 2016 trends, we invested in internal endpoint IC inventory both to meet forecasted demand and to enhance our ability to deliver in the event of another unexpected demand surge. However, in the second half of 2017, the growth rate in endpoint IC shipments slowed, which we believe was due to multiple factors including, but not limited to, delays in new deployments and in planned expansions at several large retailers. That decelerating growth engendered an endpoint IC channel inventory correction. For working capital management purposes and to most efficiently run our business, we reduced our internal endpoint IC inventory in the second half of 2018 and continued reducing it further throughout 2019.

Regardless of the uneven pace of retail industry adoption, we believe the underlying, long-term trend is continued RAIN adoption by the retail industry. We also believe that expanding retail deployments foster RAIN adoption in other markets. Consequently, we intend to continue introducing new products to improve our market position and to further grow both retail and overall market adoption.

For a non-retail example of growing RAIN adoption, particularly in supply chain, our reader and gateway sales in the second half of 2017 and our gateway sales in 2019 exceeded our expectations, due to end users deploying shipment-verification and asset-tracking use cases that demand real-time fixed reading and RAIN data integration with enterprise software systems. In addition, we see growing RAIN adoption in the aviation industry, initially in baggage tagging. We believe greater adoption of fixed readers and our system software will increase the value of our platform. However, as noted below, at the current stage of RAIN adoption, our revenue could decline on a quarterly or annual basis due to fluctuations caused by large-scale deployments by a limited numbers of large end-users.

If market adoption of RAIN, and our platform products specifically, does not meet our expectations, then our growth prospects and operating results will be adversely affected. If we discount prices to win opportunities, then our gross margins may be negatively affected. If we are unable to meet end-user or customer volume or performance expectations, then our business and prospects may be adversely affected. Because we sell our products through our channel partners, we have limited ability to determine end-user demand and we may incorrectly predict that demand or be unable to identify market shifts in a timely fashion, potentially affecting our business adversely. In contrast, if our endpoint IC, reader IC, module, reader, gateway or software sales exceed expectations, then our revenue and profitability may be positively affected.

Timing and Complexity of Customer Deployments

From 2010 to 2018, our endpoint IC unit sales volumes increased at a compounded annual growth rate of 29%, indicating growing RAIN adoption. However, the pace at which end users adopt RAIN has been uneven and unpredictable in scope and timing. For example, our endpoint IC unit sales volumes increased significantly in 2016, declined in the second half of 2017 and in the first half of 2018 and returned to growth in the second half of 2018 (the latter albeit not at the same pace as in 2016). Short-term demand will remain unpredictable in scope and timing. Longer term, we believe our opportunity and our market will continue to grow, but we cannot predict whether historical annual growth rates are indicative of the pace of that future growth.

Further, although we promote our platform as an integrated solution, we sell our products individually, and end users may use only certain of our products. For any given end-user solution, whether an end user chooses to deploy our entire platform or only a portion will also affect our operating results. We have a large and multi-tiered partner channel which serves many markets and end users; we rely on these channel partners to deploy or integrate our platform and products with end-user applications and information systems. Large-scale project deployments of our systems or platform led by our partners are often concentrated with discrete end users and may result in variability of our systems revenue and trends that are different from our endpoint IC revenue. If we are unable to replace project-based revenue from these concentrated opportunities with revenue from similar, new projects, or if end users with sizable deployments change or delay their projects without providing us adequate notice, our revenue could decline. As a result of these factors, we may experience significant fluctuation in revenue on a quarterly or annual basis, and we anticipate these factors will continue to characterize our business for the foreseeable future.

Average Selling Price

We expect our average selling prices, or ASPs, to fluctuate based on competitive pressures and the level of discounting we offer to win opportunities, and generally to decline over time. Historically, we have been able to implement manufacturing and quality improvements that effectively reduce the per-unit cost of most of our hardware products, as well as introduce newer and lower-cost products, but the timing of these cost reductions and product introductions fluctuates and may not materialize in any given quarter or year.

Seasonality

We typically renegotiate pricing with many of our endpoint IC customers with an effective date of the first quarter of the calendar year, reducing both revenue and gross margins in the first quarter when compared with prior periods. The impact tends to decline in subsequent quarters as we reduce costs and, to the extent we can migrate our customers to newer, lower-cost products, adjust product mix. Endpoint IC volumes also tend to be lower in the fourth quarter than the third quarter.

System sales tend to be stronger in the fourth quarter of the calendar year, and less strong in the first quarter. We believe this seasonality is due to the availability of residual funding for capital expenditures prior to the end of many customers' fiscal years.

While we expect these seasonal trends to continue, quarter-to-quarter variability in our revenue can be caused by a number of factors (e.g., timing of large deployments, supply constraints, etc.) that can mask seasonality in any given year. These risks and uncertainties, as well as other risks and uncertainties that could cause our actual results to differ significantly from management's expectations, are described in greater detail in Item 1A of Part II, "Risk Factors."

Inventory Supply

From time to time we may experience high inventory levels or product shortages, generally as a result of us mis-estimating customer or end-user demand or supplier manufacturing capacity, but also sometimes related to fluctuations in our market or the global economy, changes in regulations or tariffs, or for a host of other reasons. These inventory dynamics can impact some or all of our hardware products. High inventory levels can result in product obsolescence, increases in reserves or unexpected expenses that could adversely affect our business. Low inventory levels can affect our ability to meet customer demand, lengthening lead times and potentially causing us to miss opportunities, lose market share and/or damage customer relationships.

Results of Operations

The following table presents our results of operations for the periods indicated:

(in thousands, except percentages)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Revenue	\$ 40,762	\$ 34,405	\$ 6,357	\$ 112,015	\$ 88,015	\$ 24,000
Gross profit	\$ 19,781	\$ 16,548	\$ 3,233	\$ 54,070	\$ 41,970	\$ 12,100
Gross margin	48.5%	48.1%	0.4%	48.3%	47.7%	0.6%
Loss from operations	\$ (3,908)	\$ (6,815)	\$ 2,907	\$ (14,840)	\$ (28,676)	\$ 13,836

Three months ended September 30, 2019 compared with three months ended September 30, 2018

Revenue and gross profit increased primarily due to increased endpoint IC revenue and systems revenue with higher gateway and reader sales partially offset by lower reader IC sales. Gross margin increased due to leverage derived from comparable overhead costs and excess and obsolescence charges as a percentage of higher revenue, partially offset by lower margin due to product mix. Loss from operations decreased primarily due to increased gross profit, partially offset by increased operating expenses; a net increase in operating expenses was due to higher stock-based compensation and higher product development costs, partially offset by lower professional service fees primarily related to investigation costs incurred in 2018.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

Revenue and gross profit increased primarily due to increased endpoint IC revenue and systems revenue with higher gateway and reader sales partially offset by lower reader IC sales. Gross margin increased primarily due to product mix with higher margin systems revenue representing a larger portion of our total revenue and leverage derived from comparable overhead costs on increased revenue, partially offset by higher excess and obsolescence charges. Loss from operations decreased due to increased gross profit and decreased operating expenses; a net decrease in operating expenses was due to decreased restructuring costs, lower professional service fees primarily related to investigation costs and decreased personnel expenses, partially offset by increased stock-based compensation expense and higher product development costs.

Revenue

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Endpoint ICs	\$ 26,370	\$ 23,711	\$ 2,659	\$ 71,919	\$ 63,142	\$ 8,777
Systems	14,392	10,694	3,698	40,096	24,873	15,223
Total revenue	<u>\$ 40,762</u>	<u>\$ 34,405</u>	<u>\$ 6,357</u>	<u>\$ 112,015</u>	<u>\$ 88,015</u>	<u>\$ 24,000</u>

We currently derive substantially all our revenue from sales of our endpoint ICs, reader ICs, modules, readers and gateways. We sell our endpoint ICs primarily to inlay manufacturers; our reader ICs and modules primarily to OEMs and ODMs through distributors; and our readers and gateways to value-added resellers, or VARs, and system integrators, or SIs, primarily through distributors. We are beginning to sell software through these same VAR and SI partners as well as through independent software vendors. We expect endpoint IC sales to represent a majority of our revenue for the foreseeable future.

Three months ended September 30, 2019 compared with three months ended September 30, 2018

Endpoint IC revenue increased \$2.7 million primarily due to a 18% increase in shipment volumes, partially offset by lower ASPs from product mix and our annual price negotiation as discussed above under “—Factors Affecting Our Performance—Seasonality.” Systems revenue increased \$3.7 million primarily due to increased gateway sales from a large-scale deployment and reader sales due to higher shipment volumes, offset by decreased reader IC sales due to lower shipment volumes.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

Endpoint IC revenue increased \$8.8 million primarily due to a 26% increase in shipment volumes, partially offset by lower ASPs from our annual price renegotiation and the one-time product exchange that we completed in the first quarter of 2018. Systems revenue increased \$15.2 million primarily due to increased gateway sales from a large-scale deployment, and, to a lesser extent, increased reader sales from higher shipment volumes, offset by decreased reader IC sales from lower shipment volumes.

Gross Profit

(in thousands, except percentages)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Gross profit	\$ 19,781	\$ 16,548	\$ 3,233	\$ 54,070	\$ 41,970	\$ 12,100
Gross margin	48.5%	48.1%	0.4%	48.3%	47.7%	0.6%

Cost of revenue includes costs associated with manufacturing our endpoint ICs, reader ICs, modules, readers and gateways, including direct materials and outsourced manufacturing costs as well as associated overhead costs such as logistics, quality control, planning and procurement. Cost of revenue also includes charges for excess and obsolescence and warranty costs. Our gross margin varies from period to period based on product mix, ASPs as well as from charges for excess and obsolescence.

Three months ended September 30, 2019 compared with three months ended September 30, 2018

Gross profit increased due to increased endpoint IC and systems revenue as mentioned above. Gross margin increased due to leverage derived from comparable overhead costs and excess and obsolescence charges as a percentage of higher revenue, partially offset by lower margin due to product mix.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

Gross profit increased due to increased endpoint IC and systems revenue as mentioned above. Gross margin increased primarily due to product mix with higher margin systems revenue representing a larger portion of our total revenue and leverage derived from comparable overhead costs on increased revenue, partially offset by higher excess and obsolescence charges.

Operating Expenses

Research and Development

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Research and development	\$ 10,344	\$ 8,804	\$ 1,540	\$ 27,678	\$ 25,170	\$ 2,508

Research and development expense consists primarily of personnel expenses (salaries, benefits and other employee related costs) and stock-based compensation expense for our product-development personnel; external consulting and service costs; prototype materials; other new product development costs; and an allocated portion of infrastructure costs, which include occupancy, depreciation and software costs. We expect research and development expense to increase in absolute dollars in future periods as we focus on new product development and introductions.

Three months ended September 30, 2019 compared with three months ended September 30, 2018

Research and development expense increased \$1.5 million, comprised primarily of increases of \$678,000 in stock-based compensation expense from PSUs and an increased number of stock options and RSUs and \$556,000 in product development costs as a result of fluctuations in the timing of development activities. We issued PSUs in 2019 to replace what has historically been our annual cash-bonus program. For further information on our PSU grants, please refer to Note 5 of our condensed consolidated financial statements included elsewhere in this report.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

Research and development expense increased \$2.5 million, comprised primarily of increases of \$1.4 million in stock-based compensation expense from the PSUs and an increased number of stock options and RSUs and \$652,000 in product development costs as a result of fluctuations in the timing of development activities.

Sales and Marketing

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Sales and marketing	\$ 7,842	\$ 7,864	\$ (22)	\$ 24,579	\$ 24,746	\$ (167)

Selling and marketing expense consists primarily of personnel expenses (salaries, incentive sales compensation, or commission, benefits and other employee related costs) and stock-based compensation expense for our sales and marketing personnel; travel, advertising and promotional expenses; and an allocated portion of infrastructure costs, which include occupancy, depreciation and software costs. We expect sales and marketing expense to remain constant on an absolute dollar basis. We expect incentive sales compensation to fluctuate as a function of revenue.

Three months ended September 30, 2019 compared with three months ended September 30, 2018

Sales and marketing expense remained comparable to the prior period; decreases of \$377,000 in personnel expense due to lower headcount and lower bonus expense partially offset by higher commission expense and \$119,000 in infrastructure costs were offset by a \$433,000 increase in stock-based compensation expense from the PSUs and an increased number of stock options and RSUs.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

Sales and marketing expense remained comparable to the prior period; decreases of \$603,000 in personnel expense due to lower headcount and lower bonus expense partially offset by higher commission expense, \$318,000 in infrastructure costs and \$257,000 in travel related expense were offset by a \$1.2 million increase in stock-based compensation expense from the PSUs and an increased number of stock options and RSUs.

General and Administrative

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
General and administrative	\$ 5,503	\$ 6,695	\$ (1,192)	\$ 16,653	\$ 16,981	\$ (328)

General and administrative expense consists primarily of personnel expenses (salaries, benefits, and other employee related costs) and stock-based compensation expense for our executive, finance, human resources and information technology personnel; legal, accounting and other professional service fees; travel and insurance expense; and an allocated portion of infrastructure costs which include, occupancy, depreciation and software costs. We expect general and administrative expense to increase due to higher accounting and compliance costs as a result of being a public company and professional service fees related to our on-going litigation.

Three months ended September 30, 2019 compared with three months ended September 30, 2018

General and administrative expense decreased \$1.2 million, comprised of a \$1.2 million decrease in professional service fees primarily related to the investigation costs incurred in 2018, partially offset by a \$298,000 increase in stock-based compensation from the PSUs and an increased number of stock options and RSUs. Investigation costs relate to third party investigation costs incurred in relation to complaint filed by a former employee, which resulted in the audit committee of our board of directors concluding that no credible evidence supported the former employee's claims.

Nine months ended September 30, 2019 compared with nine months ended September 30, 2018

General and administrative expense decreased \$328,000, comprised of decreases of \$766,000 in professional service fees due to the investigation costs incurred in 2018 partially offset by higher legal fees and \$341,000 in personnel expense from lower bonus expense. These decreases were partially offset by a \$1.0 million increase in stock-based compensation from the PSUs and an increased number of stock options and RSUs.

Restructuring Costs (Benefits)

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Restructuring costs	\$ —	\$ —	\$ —	\$ —	\$ 3,749	\$ (3,749)

On February 13, 2018, we initiated a restructuring plan to align our strategic and financial objectives and optimize our resources for long-term growth, including a reduction-in-force affecting approximately 9% of our employees, subleasing unused office space and closing some remote offices. The restructuring was substantially complete as of June 30, 2018. As a result of the restructuring, we recorded a restructuring charge of \$3.7 million for the nine months ended September 30, 2018.

Other Income, net

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Other income, net	\$ 317	\$ 204	\$ 113	\$ 947	\$ 561	\$ 386

Other income, net for the three months ended September 30, 2019 remained comparable to the prior period. Other income, net for the nine months ended September 30, 2019 increased \$386,000 primarily due to increased accretion income from our investments.

Interest Expense

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Interest expense	\$ 413	\$ 390	\$ 23	\$ 1,263	\$ 970	\$ 293

Interest expense for the three months ended September 30, 2019 remained comparable to the prior period. Interest expense increased \$293,000 for the nine months ended September 30, 2019 primarily due to higher average outstanding borrowings in the current period compared to the prior period.

Income Tax Expense

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Income tax expense	\$ 77	\$ 69	\$ 8	\$ 151	\$ 159	\$ (8)

We are subject to federal and state income taxes in the United States and foreign jurisdictions. Income tax expense remained comparable for the periods stated above.

Non-GAAP Financial Measures

Our key non-GAAP liquidity and performance measures include adjusted EBITDA and non-GAAP net income (loss), as defined below. We use adjusted EBITDA and non-GAAP net income as key measures to understand and evaluate our core operating performance and trends, to prepare and approve our annual budget and to develop short- and long-term operating plans. We believe excluding those items inherent in calculating adjusted EBITDA and non-GAAP net income (loss) can provide useful measures for period-to-period comparisons of our business. Accordingly, we believe that adjusted EBITDA and non-GAAP net income (loss) provide useful information to investors and others in understanding and evaluating our operating results in the same manner as it does for our management and board of directors. Our presentation of these non-GAAP financial measures is not meant to be considered in isolation or as a substitute for our financial results prepared in accordance with GAAP, and our non-GAAP measures may be different from non-GAAP measures used by other companies.

Adjusted EBITDA

We define adjusted EBITDA as net loss determined in accordance with GAAP, excluding, if applicable for the periods presented, the effects of stock-based compensation; depreciation; investigation costs; restructuring costs; other income; net, interest expense; and income tax expense. We have excluded from adjusted EBITDA the net restructuring costs because we do not believe they reflect our core operations.

The following table presents a reconciliation of net loss to adjusted EBITDA:

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Net loss	\$ (4,081)	\$ (7,070)	\$ 2,989	\$ (15,307)	\$ (29,244)	\$ 13,937
Adjustments:						
Other income, net	(317)	(204)	(113)	(947)	(561)	(386)
Interest expense	413	390	23	1,263	970	293
Income tax expense	77	69	8	151	159	(8)
Depreciation	1,220	1,136	84	3,637	3,394	243
Stock-based compensation	4,793	3,335	1,458	11,813	8,013	3,800
Restructuring costs	—	—	—	—	3,749	(3,749)
Investigation costs	—	1,449	(1,449)	—	1,449	(1,449)
Adjusted EBITDA	<u>\$ 2,105</u>	<u>\$ (895)</u>	<u>\$ 3,000</u>	<u>\$ 610</u>	<u>\$ (12,071)</u>	<u>\$ 12,681</u>

Non-GAAP Net Income (Loss)

We define non-GAAP net income (loss) as net loss determined in accordance with GAAP, excluding, if applicable for the periods presented, the effects of stock-based compensation; depreciation; investigation costs; restructuring costs; amortization of debt issuance costs; and non-cash income tax expense. We exclude from non-GAAP net income (loss) the non-cash portion of income taxes because of our ability to offset a substantial portion of future income tax liabilities by utilizing our deferred tax assets, comprised primarily of federal net-operating-loss carryforwards and federal research and experimentation credit carryforwards. We have excluded from non-GAAP net income (loss) the net restructuring costs because we do not believe they reflect our core operations.

The following table presents a reconciliation of net loss to non-GAAP net income (loss):

(in thousands)	Three Months Ended September 30,			Nine Months Ended September 30,		
	2019	2018	Change	2019	2018	Change
Net loss	\$ (4,081)	\$ (7,070)	\$ 2,989	\$ (15,307)	\$ (29,244)	\$ 13,937
Adjustments:						
Depreciation	1,220	1,136	84	3,637	3,394	243
Stock-based compensation	4,793	3,335	1,458	11,813	8,013	3,800
Restructuring costs	—	—	—	—	3,749	(3,749)
Investigation costs	—	1,449	(1,449)	—	1,449	(1,449)
Amortization of debt issuance costs	16	18	(2)	51	57	(6)
Non-cash income tax expense	—	12	(12)	—	40	(40)
Non-GAAP net income (loss)	<u>\$ 1,948</u>	<u>\$ (1,120)</u>	<u>\$ 3,068</u>	<u>\$ 194</u>	<u>\$ (12,542)</u>	<u>\$ 12,736</u>

Liquidity and Capital Resources

As of September 30, 2019, we had cash, cash equivalents and investments of \$63.1 million, comprising cash deposits held at major financial institutions and short-term investments in a variety of securities, including U.S. government agencies, treasury bills, corporate notes and bonds, commercial paper and money market funds. We had working capital of \$105.0 million as of September 30, 2019. Historically, we funded our operations principally through cash generated from operations, issuing equity securities or borrowing under our senior credit facility. In 2019, our principal uses of cash are funding operations to capture our market opportunity and capital expenditures.

Sources of Funds

We believe, based on our current operating plan, that our existing cash, cash equivalents, short-term investments and available borrowings under our senior credit facility will be sufficient to meet our anticipated cash needs for at least the next 12 months.

From time to time, we may explore additional financing sources and means to finance our long-term strategy or lower our cost of capital, which could include equity, equity-linked financing and debt financing. In addition, in connection with any future acquisitions, we may require additional funding which may be provided in the form of additional debt, equity, equity-linked financing or a combination thereof. There can be no assurance that any additional financing will be available to us on acceptable terms.

Senior Credit Facility

On March 5, 2018, we amended our senior credit facility to, among other things, extend the maturity date of the \$25.0 million revolving credit facility, with a \$5.0 million letter of credit sub-facility, to March 5, 2020, and provide for a \$20.0 million term loan. We incurred \$9.0 million in term loan borrowings to refinance \$7.9 million of term loan borrowings and \$1.1 million of equipment loans and have \$11.0 million of term loan borrowings available for general corporate purposes. On August 17, 2018, we amended our senior credit facility to provide for a \$4.0 million equipment advance which we used solely to purchase equipment.

On April 26, 2019, we amended our senior credit facility to, among other things, extend the maturity date of the \$25.0 million revolving credit facility, with a \$5.0 million letter of credit sub-facility, to May 1, 2021 and refinance the existing term loan and equipment advance with a new \$23.5 million term loan. The term loan will amortize over 36 months, beginning on May 1, 2020, following an initial 12-month interest-only period, and mature on April 1, 2023. We may prepay the term loan at any time, subject to a prepayment fee equal to 2.0% of the outstanding principal amount if prepaid on or before April 26, 2020, or 1.0% of the outstanding principal amount if prepaid after April 26, 2020, but on or before April 26, 2021. There were no changes to the term loan interest rates or financial covenants as a result of this amendment.

The senior credit facility includes financial and operating covenants, including a minimum liquidity ratio and maximum adjusted EBITDA loss threshold that both apply in the event we do not maintain a minimum liquidity threshold, which are set forth in detail in the credit facility agreement. We were in compliance with the covenants under our senior credit facility as of September 30, 2019. Our obligations under the senior credit facility are collateralized by substantially all our assets other than intellectual property.

The loans accrue interest, at our option, at (1) a LIBOR rate determined in accordance with the senior credit facility, plus a margin ranging from 2.75% to 3.50%, or (2) a prime rate determined in accordance with the senior credit facility, plus a margin ranging from 0.00% to 0.75%. The margin percentage is determined based upon whether the outstanding borrowing is a term loan, revolving loan, or an equipment advance and our adjusted EBITDA for the preceding 12-month period. Interest is due and payable in arrears monthly for prime rate loans and at the end of an interest period for LIBOR rate loans.

At September 30, 2019, \$23.5 million of term loan borrowings were outstanding, excluding unamortized debt issuance costs of \$117,000, and no revolver borrowings were outstanding. Term loan interest rates were 5.75%. For information on our debt facilities, please refer to Note 7 of our condensed consolidated financial statements included elsewhere in this report.

Cash Flows

The following table presents selected cash flow data for the periods presented:

(in thousands)	Nine Months Ended September 30,	
	2019	2018
Net cash provided by (used in) operating activities	\$ 214	\$ (16,705)
Net cash used in investing activities	(8,213)	(1,046)
Net cash provided by financing activities	7,400	16,059

Operating Cash Flows

For the nine months ended September 30, 2019, we generated \$214,000 of net cash from operating activities. The net cash proceeds were primarily driven by \$484,000 of working capital contribution, partially offset by \$270,000 of a net loss adjusted for non-cash items. Working capital contribution was primarily due to lower cash usage in inventory purchases, partially offset by lower cash collections in accounts receivable due to the timing of when amounts came due.

For the nine months ended September 30, 2018, we used \$16.7 million of net cash from operating activities. This cash usage was primarily driven by \$18.5 million of a net loss adjusted for non-cash items, offset by \$1.8 million of working capital contribution primarily due to higher cash collections in accounts receivable due to the timing of when amounts came due, partially offset by higher cash usage in inventory purchases.

Investing Cash Flows

For the nine months ended September 30, 2019, we used \$8.2 million of net cash from investing activities. The net cash usage was primarily driven by investment and equipment purchases of \$59.0 million and \$1.0 million, respectively. These purchases were partially offset by investment maturities of \$51.8 million.

For the nine months ended September 30, 2018, we used \$1.0 million of net cash from investing activities. The net cash usage was primarily driven by investment and equipment purchases of \$33.4 million and \$3.1 million, respectively. These purchases were partially offset by investment maturities of \$35.4 million.

Financing Cash Flows

For the nine months ended September 30, 2019, we generated \$7.4 million of net cash from financing activities. The net cash proceeds were primarily comprised of \$8.0 million in proceeds from exercised stock options and our employee stock purchase plan and \$4.0 million in term loan borrowings, net of debt issuance costs. These proceeds were partially offset by repayments of indebtedness of \$4.2 million of principal under our senior credit facility.

For the nine months ended September 30, 2018, we generated \$16.1 million of net cash from financing activities. The net cash proceeds were primarily comprised of \$16.4 million in term loan borrowings, net of debt issuance costs, and \$2.6 million in proceeds from exercised stock options and our employee stock purchase plan. These proceeds were partially offset by repayments of indebtedness of \$2.2 million of principal under our senior credit facility and payments of \$717,000 for capital lease financing obligations.

Contractual Obligations

The following table reflects a summary of our contractual obligations as of September 30, 2019:

	Payments Due By Period				
	Total	Less Than 1 Year	1-3 Years	3-5 Years	More Than 5 Years
(in thousands)					
Senior credit facility (1)	\$ 26,576	\$ 4,696	\$ 17,222	\$ 4,658	\$ —
Finance lease obligations	390	371	18	—	—
Operating lease obligations					
Operating lease obligations	28,565	4,720	9,465	6,844	7,536
Sublease income	(4,706)	(1,363)	(2,850)	(493)	—
Net operating lease commitments	23,859	3,357	6,615	6,351	7,536
Purchase commitments (2)	15,292	14,449	843	—	—
Total	<u>\$ 66,117</u>	<u>\$ 22,873</u>	<u>\$ 24,699</u>	<u>\$ 11,009</u>	<u>\$ 7,536</u>

(1) Senior credit facility includes estimated interest payments. As of September 30, 2019, \$23.5 million of term loan borrowings were outstanding, excluding unamortized debt issuance costs of \$117,000. Term loan interest rates were 5.75% as of September 30, 2019.

(2) Purchase commitments consist primarily of non-cancelable commitments to purchase \$12.4 million of inventory as of September 30, 2019, as well as non-cancelable software license agreements with vendors.

Off-Balance Sheet Arrangements

Since inception, we have not had any relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or for another contractually narrow or limited purpose.

Critical Accounting Policies and Significant Estimates

We have prepared our condensed consolidated financial statements in accordance with GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, expenses and related disclosures. We evaluate our estimates and assumptions on an ongoing basis. Our estimates are based on historical experience and various other assumptions that we believe to be reasonable under the circumstances. Our actual results could differ from these estimates and assumptions. For information on our critical accounting policies and estimates, see Part II, Item 7 (Management's Discussion and Analysis of Financial Condition and Results of Operations) of our Annual Report on Form 10-K for the year ended December 31, 2018.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risks in the ordinary course of our business. These risks primarily consist of interest-rate fluctuations.

Interest Rate Risk

Under our current investment policy, we invest our excess cash in money market funds, U.S. government agency securities, corporate notes and bonds, treasury bills, commercial paper and money market funds. Our current investment policy seeks first to preserve principal, second to provide liquidity for our operating and capital needs and third to maximize yield without putting our principal at risk. We do not enter into investments for trading or speculative purposes.

We had cash, cash equivalents and short-term investments of \$63.1 million as of September 30, 2019. Our investments are exposed to market risk due to the fluctuation in prevailing interest rates that may reduce the yield on our investments or their fair value. As our investment portfolio is short-term in nature, we do not believe a hypothetical 100 basis point increase in interest rates or a hypothetical decrease of 10% in the effective yield of our investments would have a material effect on our interest income, and therefore we do not expect our results of operations or cash flows to be materially affected by a sudden change in market interest rates.

We are subject to interest rate risk in connection with the borrowings under our senior credit facility, which accrue interest at variable rates. As of September 30, 2019, borrowings for our term loan had interest rates of 5.75%. A hypothetical 100 basis point increase in interest rates would result in a \$0.5 million increase in our interest expense until the scheduled maturity date in 2023.

Inflation Risk

We do not believe that inflation has had a material effect on our business, financial condition or results of operations. If our costs were to become subject to significant inflationary pressures, we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could adversely affect our business, financial condition and results of operations.

Foreign Currency Exchange Risk

We consider our foreign subsidiaries to be extensions of the U.S. company. The functional currency of our foreign subsidiaries is the U.S. dollar. Accordingly, gains and losses resulting from remeasuring transactions denominated in currencies other than U.S. dollars are included in other income, net on our condensed consolidated statements of operations. For any of the periods presented, we did not have material impact from exposure to foreign currency fluctuation. As we grow operations, our exposure to foreign currency risk will likely become more significant.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and our principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of September 30, 2019. Disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, 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 (1) recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and (2) accumulated and communicated to management, including its principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Based on the evaluation of our disclosure controls and procedures, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective at a reasonable assurance level as of September 30, 2019.

Changes in Internal Control over Financial Reporting

There were no changes that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting during the three months ended September 30, 2019.

Limitations on Controls

Our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of achieving the desired control objectives. Our management recognizes that any control system, no matter how well designed and operated, is based upon certain judgments and assumptions and cannot provide absolute assurance that its objectives will be met. Similarly, an evaluation of controls cannot provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected.

PART II — OTHER INFORMATION

Item 1. Legal Proceedings.

In the normal course of business, we may be named as a party to various legal claims, actions and complaints. We cannot predict whether any resulting liability will have a material adverse effect on our financial position, results of operations or cash flows.

Stockholder Litigation

Between July 2018 and July 2019, four class action complaints for violation of federal securities laws (one of which was subsequently voluntarily dismissed by the plaintiffs) and three shareholder derivative actions were filed against us and certain of our officers and, in the derivative actions, against certain of our directors. For further information, please refer to Note 6 of our condensed consolidated financial statements included elsewhere in this report.

Patent Litigation

On June 6, 2019, we filed a patent infringement lawsuit against a major competitor, NXP, USA Inc., and on October 4, 2019, NXP USA, Inc. and its parent NXP Semiconductors N.V., filed a patent infringement lawsuit against Impinj. For further information, please refer to Note 6 of our condensed consolidated financial statements included elsewhere in this report.

Item 1A. Risk Factors.

You should carefully consider the following risk factors, in addition to the other information contained in this report, including the section of this report captioned “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and related notes. If any of the events described in the following risk factors and the risks described elsewhere in this report occurs, our business, operating results and financial condition could be seriously harmed. This report also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of factors that are described below and elsewhere in this report.

Risks Relating to Our Business and Industry

RAIN market adoption is uncertain. If RAIN market adoption does not continue to develop, or develops more slowly than we expect, our business will suffer.

The RAIN market is relatively new and, to a large extent, unproven. RAIN technology and product adoption, including that of Impinj’s products and platform, will depend on numerous factors, including:

- whether end users embrace the benefits we believe RAIN offers, and if so whether RAIN will achieve and sustain high demand and market adoption;
- whether end users perceive that the benefits of RAIN adoption outweigh the cost and time to install, replace or modify their existing systems and processes; and
- whether the technological capabilities of RAIN products and applications meet end users’ current or anticipated needs.

The adoption of RAIN technology and products has historically been slower than anticipated or forecasted by us and industry sources. Our industry has also experienced periods of accelerated adoption that were not sustained. For example, RAIN adoption accelerated rapidly in 2016, which resulted in longer lead times. We invested in endpoint IC inventory both to meet forecasted demand and to enhance our ability to deliver in the event of another unexpected demand surge. However, in the second half of 2017 and early 2018, the growth rate in endpoint IC shipments decreased relative to 2016, which we believe was due to multiple factors including, but not limited to, delays in new deployments and in planned expansions at several large retailers.

The pace of RAIN adoption will turn on prospective customers' knowledge of our products and our ability to convey to them the real value of using RAIN products or platforms over those incorporating other technologies. End users and our prospective customers may not be familiar with our products or RAIN in general, or may use other products and technologies to identify, locate, authenticate, engage, track and prevent loss of their items. Additionally, even if prospective customers are familiar with RAIN, our products or platform, a negative perception of, or experience with, RAIN or a competitor's RAIN products may deter them from adopting RAIN or our products or platform. Before they adopt RAIN, businesses, government agencies and other organizations may need education on the benefits of using RAIN in their operations, and how they outweigh the costs, including potentially significant costs of modifying or replacing existing systems and processes. These educational efforts may not be successful, and organizations may decide that the costs of adopting RAIN outweigh the benefits or may decide to defer near-term RAIN adoption in favor of a more advanced or comprehensive future deployment. Failure of organizations to adopt RAIN generally, and our products and platform specifically, for any reason will hurt the development of our market and, consequently, impair our business and prospects.

Fluctuations in the adoption of RAIN products and solutions may affect our ability to forecast our future operating results, including revenue, gross margins, cash flows and profitability. Moreover, to ensure adequate inventory supply, we must forecast inventory needs and expenses and place orders sufficiently in advance with our suppliers and contract manufacturers based on our estimates of future demand for particular products. Our failure to accurately forecast demand may cause us to experience excess inventory levels or a shortage of products available for sale.

If RAIN adoption by retailers does not continue at the rate we expect, our business will be adversely affected.

The retail apparel industry leads RAIN adoption, and retail end users were the largest consumers of our endpoint ICs in 2016, 2017, 2018 and the first half of 2019. We believe retail RAIN deployments are a leading indicator of overall RAIN market adoption. If apparel retailers continue adopting RAIN, then we believe adoption in other industries is likely to accelerate. As such, the retail industry is one of our key strategic focus areas.

If retailers or others deploying RAIN fail to realize demonstrable benefits from RAIN or delay or abandon their deployments, overall RAIN market acceptance may be materially and adversely affected. For example, in the second half of 2017 and early 2018, the pace of growth in endpoint IC unit-volume shipments decreased relative to 2016, which we believe was due to multiple factors including, but not limited to, delays in new deployments and in planned expansions at several large retailers. Moreover, retailers that have a primarily physical presence in the marketplace have experienced financial stress in recent periods. Many of these retailers have deployed RAIN to improve competitiveness; however, if they fail to compete effectively, the number of stores they maintain, and thus the scope of their RAIN deployments, may decrease significantly. In addition, uncertainties caused by possible imposition of tariffs may cause retailers to change their supply chain and slow RAIN adoption as a consequence. Any widespread delay, slowdown or failure by retailers or other organizations to implement RAIN-based systems generally, and our products and platform specifically, will materially and adversely affect our business, operating results, financial condition and long-term prospects.

If we are unsuccessful in fostering meaningful adoption of our products and platform by end users other than retailers, our business prospects may be adversely affected.

We expect end users to deploy our platform in sectors beyond retail, including, for example in supply chain, aviation and healthcare. If we fail to make our products and platform an easy-to-deploy, economical solution for use cases in these other sectors, our ability to penetrate them may suffer and our business prospects may be adversely affected.

We have a history of losses and have only achieved profitability intermittently. We cannot be certain that we will increase or sustain profitability in the future.

We have incurred losses since our inception in 2000. While we were profitable between 2013 and 2015, we had a net loss of \$15.3 million for the nine months ended September 30, 2019 and an accumulated deficit of \$255.1 million as of September 30, 2019. Our ability to regain or sustain profitability depends on numerous factors, many of which are out of our control, including continued RAIN adoption and our market share. We expect significant expenditures to support operations, product development, and business and headcount expansion in sales, engineering, and marketing as a public company. If we fail to increase our revenue or manage our expenses, we may not increase or sustain profitability in the future.

Fluctuations in our quarterly and annual operating results may adversely affect our business, prospects and stock price.

You must consider our business and prospects in light of the risks and difficulties we encounter in the uncertain and rapidly evolving RAIN market. Because this market is new and evolving, predicting its future growth rate and size is difficult. The rapidly evolving nature of the markets in which we sell our products, as well as other factors that are beyond our control, reduce our ability to accurately evaluate our future prospects and forecast quarterly or annual performance.

End users drive demand for our products. Because we sell nearly all of our products through channel partners, our ability to determine and forecast end-user demand is limited.

For example, our 2016 endpoint IC sales exceeded both our expectations and those of our industry's analysts due in large part to several coincident large-scale deployments. However, in portions of 2017 and 2018, the pace of growth in endpoint IC unit-volume shipments decreased relative to 2016, which we believe was due to multiple factors including, but not limited to, delays in new deployments and in planned expansions at several large retailers as well as an endpoint IC channel-inventory correction.

Forecasting end-user demand for other elements of RAIN solutions is also difficult. We rely on our channel partners to integrate our RAIN-based systems products with end-user information systems and this integration has been uneven and unpredictable in scope, timing and implementation. Also, RAIN-based systems in general often involve time-consuming proofs-of-concepts and other time-consuming steps such as designing and implementing new business processes, which make sales of our system products difficult to forecast. Partly as a consequence, in the past, both we and other industry participants have at times overestimated the RAIN market size and growth rates, then failed to meet expectations.

To date, we have had limited success in accurately predicting future sales of our products and platform. Due to our shorter lead-times for endpoint ICs in 2018 and the first half of 2019 relative to prior years, we are increasingly receiving customer orders and shipping the products within a quarter. A shortened sales cycle decreases our ability to accurately predict both optimal inventory supply and order volume for a quarter. Additionally, customer orders for readers and gateways are generally weighted toward the end of a quarter. If we do not have adequate supply of readers and gateways to fulfill the orders within a quarter or if we do not accurately predict the sales cycle for reader and gateways, sales of some sizeable transactions might extend into a subsequent quarter. We expect that for the foreseeable future our visibility into future sales, including both volumes and prices, will continue to be limited. This poor visibility may cause fluctuations in our operating results, particularly on a quarterly basis, that we are unable to predict as well as failure to achieve our expected operating results.

In addition, if endpoint IC sales (one indicator of market adoption) exceed expectations or if we discount prices to win a particularly large opportunity or in response to competition, our revenue and profitability may be positively affected, but gross margins may be negatively affected depending on product mix for the applicable period. If research analysts or investors perceive such product mix shift negatively, the trading price of our common stock could be adversely affected.

Numerous other factors, many of which are outside 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. In addition, these fluctuations may result in unanticipated decreases in our available cash, which could negatively affect our business and prospects. Factors that may contribute to fluctuations in our operating results and revenue include:

- variations in RAIN adoption and deployment delays by end users;
- fluctuations in demand for our products or platform, including by tag manufacturers and other significant customers on which we rely for a substantial portion of our revenue;
- fluctuations in the available supply of our products;
- variations in the quality of our products and return rates;
- declines in selling prices for our products;
- delays in our product-shipment timing, customer or end-user sales or deployment cycles, or work performed under development contracts;
- intellectual property disputes involving us, our customers, end users or other participants in our industry;
- adverse outcomes of litigation or governmental proceedings;
- timing variability in product introductions, enhancements, services, and technologies by us and our competitors and market acceptance of these new or enhanced products, services and technologies;
- unanticipated excess or obsolete inventory as a result of supply-chain mismanagement, new-product introduction, quality issues or otherwise;
- changes in the amount and timing of our operating costs, including those related to the expansion of our business, operations and infrastructure;
- changes in business cycles or seasonal fluctuations that may affect the markets in which we sell;
- changes in industry standards or specifications, or changes in government regulations, relating to RAIN, or Impinj's products or platform;
- late, delayed or cancelled payments from our customers; and
- unanticipated impairment of long-lived assets and goodwill.

A substantial portion of our operating expenses are fixed for the short term, and as a result, fluctuations in revenue or unanticipated expenses can have a material and immediate impact on our profitability. The occurrence of any one of these risks could negatively affect our operating results in any particular period, which could cause the price of our common stock to decline.

Our market is very competitive. If we fail to compete successfully, our business and operating results will suffer.

We face significant competition from both established and emerging competitors. We believe our principal current competitors are: in endpoint ICs, NXP B.V., or NXP, and Alien Technology Corporation, or Alien; in reader ICs, STMicroelectronics N.V., Phychips Inc, MagicRF Co., Ltd., and Zhikun Semiconductor Co. Ltd, or Iotelligent; and in readers and gateways, Alien and Zebra Technologies Corporation, or Zebra. Our channel partners, including distributors, system integrators, or SIs, value-added resellers, or VARs, and software solution partners, may enter our market and compete with us rather than purchase our products, which would not only reduce our customer base but also increase competition in the market, adversely affecting our operating results, business and prospects. In addition, companies in adjacent markets or newly formed companies may decide to enter our market, particularly as RAIN adoption grows.

Competition for customers is intense. Because the RAIN market is evolving rapidly, winning customer and end-user accounts at an early stage in the development of the market is critical to growing our business. End users that instead use competing products and technologies may face high switching costs, which may affect our and our channel partners' ability to successfully convert them to our products. Failure to obtain orders from customers and end users, for competitive reasons or otherwise, will materially adversely affect our operating results, business and prospects.

Some of our competitors may devote more resources than we can to the development, promotion, sale and support of their products. Our competitors include companies that have much greater financial, operating, research and development, marketing and other resources than us. These competitors may discount their products to gain market share. In doing so, they could simply accept smaller margins, or they could maintain margins by achieving cost savings through better, more efficient designs or production methods. To gain share, competitors could also bundle near-field communication, or NFC, products with RAIN products, or stationary readers with handheld readers. New competitors could enter the gateway market or develop RAIN platforms or solutions. Larger or more established companies may deliver and directly compete with our products or platform. Smaller companies could launch new products and applications we do not offer and could gain market acceptance quickly. Moreover, consolidation in the RAIN industry could intensify the competitive pressures that we face. Many of our existing and potential competitors may be better positioned than we are to acquire other companies, technologies or products.

Some of our customers have policies requiring diverse supplier bases to enhance competition and maintain multiple RAIN product providers. They do not have an interest in purchasing exclusively from one supplier or promoting a particular brand. Our ability to increase order sizes from these customers and maintain or increase our market share is constrained by these policies. In addition, any decline in quality or availability of our products or any increase in the number of suppliers that such a customer uses may decrease demand for our products and adversely affect our operating results, business and prospects.

In short, as the RAIN market develops, we will face ever increasing competition from new or newly enhanced products from our existing competitors, or from entirely new competitors in our market. These competitors may have, or may develop, processes or product designs that will enable them to offer more competitive products than ours. Any failure to compete successfully will materially adversely affect our business, prospects, operating results and financial condition.

Downturns in the industries we serve, particularly retail, may adversely affect our business.

Worldwide economic conditions have exhibited significant fluctuations in the past, and customers remain guarded with respect to market volatility and uncertainty. As a consequence, we and our customers have had difficulty forecasting and planning future business activities accurately. Volatile economic conditions could cause our customers or end users to reduce their capital-expenditure budgets, which could decrease spending for our products resulting in delayed and lengthened deployment, a decrease in sales or a loss of sales opportunities. The retail industry is subject to volatility, especially during uncertain economic conditions. A downturn in the retail industry in particular may disproportionately affect us because retailers comprise a significant portion of the RAIN end users. We cannot predict the timing, strength or duration of any economic slowdown or recovery, whether global, regional or within specific markets. If the conditions of the general economy or markets in which we operate worsen, our business could be adversely affected.

If we fail to obtain quality products in adequate quantity and in a timely and cost-effective manner, our operating results and growth prospects will be adversely affected.

We do not own or operate manufacturing facilities, and we do not control our manufacturers' or subcontractors' ability or willingness to meet our supply requirements. Currently, all our endpoint IC wafers are manufactured by Taiwan Semiconductor Manufacturing Company Limited, or TSMC, and primarily post-processed by our subcontractor Stars Microelectronics (Thailand) Public Company Limited, or Stars; all our reader IC wafers are manufactured by TowerJazz Ltd., or TowerJazz; all our modules are manufactured by Stars and Microelectronics Technology Inc., or MTI; and all our readers and gateways are manufactured by Plexus Corp., or Plexus, or Computrol, Inc, or Computrol. We also use subcontractors for post-processing, assembly and testing.

Currently, we do not have long-term supply contracts with TSMC, TowerJazz, MTI, Plexus or Computrol, and neither they nor our subcontractors are required to supply us with products for any specific period or in any specific quantity. Suppliers can allocate production capacity to other companies' for any reason and reduce deliveries to us on short notice, negatively affecting our ability to secure a sufficient supply of product for sale.

Some components of our products have longer lead times and we place orders with some of our suppliers five or more months before our anticipated product delivery dates to our customers. We base these orders on our customer-demand forecasts and on an assumed level of production that may prove to be inaccurate. If we inaccurately forecast this customer demand, or if production levels are constrained for any reason, then we may be unable to obtain adequate and cost-effective components, or foundry or assembly capacity to meet our customers' delivery requirements, or we may accumulate excess inventory or suffer inventory shortages.

Manufacturing capacity may not be available when we need it or at reasonable prices, which result in us not being able to satisfy demand for our products fully, or may distort apparent future demand. For example, in 2010 we experienced wafer shortages from TSMC relative to our submitted endpoint IC wafer purchase orders because of high worldwide demand for semiconductor foundry capacity. These shortages adversely affected our ability to meet our customers' demand and, in some cases, caused customers to cancel orders, qualify alternative suppliers or purchase from our competitors. As another example, in mid-2016, as a consequence of rapid growth in endpoint IC demand, we depleted our endpoint IC buffer stock and were temporarily unable to satisfy customer demand at that time, causing some customers to purchase competitive products even as we increased production. In response to similar future shortages, our customers may act similarly or, alternatively, may overbuy our products, which could artificially inflate sales in near-term periods while leading to sales declines in future periods as our customers consume their accumulated inventory.

At times, our suppliers ask us to purchase excess products to ensure we do not face a subsequent shortage. For example, in certain quarters of 2014, 2015 and 2016, we purchased more wafers from TSMC than we required, which affected our available cash for that quarter. In addition, we may invest significantly in inventory to support anticipated growth in our business, as we did with endpoint IC inventory in 2017. If we are unable to sell the additional inventory we purchased, or if we must sell it at lower prices due to excess inventory or obsolescence, our operating results may be adversely affected.

If our suppliers fail to deliver products at reasonable prices or with satisfactory quality levels, then our ability to bring products to market and our reputation could suffer. For example, if supplier capacity diminishes, including from a catastrophic loss of facilities or otherwise, we could have difficulty fulfilling our orders, our revenue could decline, and our growth prospects could be impaired. We anticipate requiring three to 18 months to transition our assembly services or foundries to new providers. Such a transition would likely require a qualification process by our customers or end users, which could also adversely affect our ability to sell our products and our operating results. Moreover, in the event of a suspected quality issue, the process of testing suspect products and diagnosing and fixing defects could be time consuming and costly and could constrain our ability to supply customers with products.

If we are unsuccessful introducing new products and enhancements, our operating results will be harmed.

To keep pace with technology developments, satisfy increasingly stringent end-user requirements and achieve market acceptance, we plan to introduce new products and solutions. We commit significant resources to developing these new products and solutions while improving performance, reliability and reducing costs. Because our products are often used in, and incorporated into, complex business processes and use cases, introduction of our new products and solutions may take time to be successful or may not succeed at all.

For example, we are investing substantial resources to develop and enhance our system software but do not expect to realize material revenue from this software in the near future. The market for our software is nascent, and we need to create market awareness of its benefits to drive end-user adoption. Creating market awareness includes promoting our software as a foundation on which end users, ISVs, consultants, SIs, and others can develop applications that meet end-user needs and drive adoption. We may be late in delivering or improving our software to meet our partners' or end users' needs. In addition, we have limited experience developing and selling software products and cannot be certain that our proposed pricing model, sales strategy, or software quality and reliability will be successful. We rely on and must train our channel partners to sell, develop applications for and integrate our software with end users' systems, but we cannot guarantee that we or they will be successful doing so. We believe that we must continue to dedicate a significant amount of resources to our development efforts to develop and maintain our competitive position. We also cannot be certain that our software will generate revenue from these investments for several years, if it all, or that such revenue will exceed the investment we are committing to develop and deploy our software.

The success of a new or enhanced product is impacted by accurate forecasts of long-term market demand. We may also fail to anticipate or meet market requirements for new features and functionality. By focusing on certain new products and industries, we may miss opportunities for other products and applications that may be more widely adopted.

Similarly, the introduction of new endpoint ICs may take longer than we expect for a number of reasons. Inlay partners may face complications or delays in qualifying inlays incorporating new endpoint ICs with resources such as the ARC Program at Auburn University (discussed below) that certify inlays for specific deployments. Inlay partners may also encounter complications incorporating new endpoint ICs into their production process and potentially slower-than-expected adoption of new endpoint ICs by end users.

If we are unable to develop new products and services using new or enhanced technologies, our competitive position will be adversely affected.

In the future, we may not succeed in developing the underlying technologies or processes necessary to create new or enhanced products and services, or license or otherwise acquire these technologies from third parties. In some instances we may be late to market with our innovations, or may choose to be a “fast follower” but subsequently be unable to overcome the lead we gave to our competition. The success of a new or enhanced product depends on technological developments, market positioning and timing, as well as on various implementation factors, including:

- our timely and efficient completion of the design process;
- our timely and efficient implementation of manufacturing, assembly and testing procedures;
- product or service performance;
- product certification;
- our ability to attract, retain and manage technical personnel;
- the quality, reliability and selling price of the product or service; and
- effective marketing, sales and service.

If we are unable to develop new products, features and services to compete effectively, our market share could be adversely affected, which would harm our business, financial condition and operating results.

An inability or limited ability of enterprise systems to exploit RAIN information may adversely affect the market for our products.

A successful end-user RAIN deployment requires not only tags and readers or gateways, but integration with information systems and applications that derive business value from endpoint data. Unless technology providers continue developing and advancing business analytics tools, and end users install or enhance their information systems and applications to use these tools, deployments of RAIN products and applications could stall. Our efforts to foster development and deployment of these tools by providing software that delivers item-level data could fail. In addition, our guidance to business-analytics tool providers for integrating our products with their tools could prove ineffective.

Solution providers and systems integrators form an essential part of the RAIN market by providing deployment know-how to end users who are unable to deploy RAIN solutions on their own. Our efforts to train and support these solution providers and systems integrators could fail. Further, integrating our products with end-user information systems could prove more difficult or time consuming than we or they anticipate, which could delay deployments. If end users are unable to successfully exploit RAIN data, or if we are unable to support solution providers or systems integrators adequately, or if deployments of our platform are delayed, we could see a material adverse impact on our business, operating results, financial condition or prospects.

Our reliance on a small number of customers could adversely affect our business and operating results.

We sell our endpoint ICs directly to inlay and tag OEMs and ODMs. In 2018, sales to tag OEMs, Avery Dennison, Smartrac and Arizon accounted for 22%, 17%, and 10% of our total revenue, respectively. This sales concentration to a relatively small number of tag OEMs lowers our bargaining power and increases the risk that our pricing or sales could decline quickly based on aggressive pricing or sales measures taken by our competitors or our own failure to compete effectively.

We sell our reader ICs and modules to reader OEMs and ODMs, and our readers and gateways to VARs and SIs, primarily through distribution. We sell software through these same partners as well as through ISV partners. We have experienced in the past and may again experience in the future purchasing delays or disruptions by some of these channel partners due to conditions within their organizations that are independent of market demand for our products or the RAIN market generally.

Although our strategy is to diversify our partner base by pursuing increased orders from smaller partners, add new partners, and increase end-user demand for our products, we may not succeed in doing so. The number of tag OEMs may decrease by consolidation or otherwise. Even if we are successful in obtaining and retaining new partners, our small number of existing large tag OEMs may continue to account for a substantial portion of our future sales. Changes in markets, channel partners, end-user customers, products, negative economic or financial developments, or poor or limited credit availability may adversely affect the ability of our tag OEMs, reader and gateway partners and distributors to bring our products to market. If our reader IC or module OEMs are unable to obtain components for products in which our products are included, our product sales could be adversely affected.

Our future performance will depend, in part, on our ability to attract new tag OEMs, reader and gateway partners and distributors that use, market and support our products effectively, especially in market segments where we have not sold products previously. If we cannot retain our current tag manufacturers, reader and gateway partners and distributors or establish new relationships, our business, financial condition and operating results could be harmed. In addition, our competitors' strategic relationships with or acquisitions of these tag OEMs, reader and gateway partners or distributors could disrupt our relationships with them. Any such disruption could impair or delay our product sales to end users and increase our costs of distribution, which could adversely affect our sales or operating results.

We also engage with large enterprises to adopt our RAIN solutions in sizable projects that can make our revenues and operating results more volatile than they would be without these large deployments. These large deployments, often involving purchases of our readers and gateways, often center on discrete deployments that can result in significant sales for periods of time. If we are unable to replace project-based revenue from these concentrated sales opportunities with revenue from similar, new projects, or if end users with sizable deployments change or delay their projects without providing us with adequate notice, our sales could decline significantly from period to period and harm our stock price as a result.

Our reliance on distributors, SIs, VARs and software solution providers to sell and distribute our products to end users could harm our business and revenue.

We rely on our partner ecosystem to sell and distribute our products to end users. Our revenue depends on their ability to successfully market, sell, install and provide technical support for the solutions in which our products are integrated or to sell our products on a standalone basis. Our revenue will decline if our channel partners fail. Further, faulty or negligent implementation and installation of our products by systems integrators may harm our reputation.

Because we fulfill through channel partners, our ability to determine end-user demand is limited. End users drive demand for our products but because we are often at least one step removed from these end users, we may be unable to rectify damage to our reputation caused by our channel partners who have more direct contact with these end users. For strategic or other reasons, our channel partners may choose to prioritize the sale of our competitors' products over our products. Furthermore, some of our channel partners may offer some products that compete with our products and may limit sales of our competing products. If our distributors, SIs, VARs or software solution providers are unable to sell an adequate amount of our products in a given quarter or if they choose to decrease their inventories of our products for any reason, our sales to these channel partners and our revenue will decline.

Many of our channel partners provide us with customer referrals and cooperate with us in marketing our products; however, our relationships with them may end at any time. If we fail to successfully manage our relationships with our channel partners, our ability to sell our products into new industries and to increase our penetration into existing industries may be impaired and our business will be harmed.

If our channel partners do not properly forecast end users' demand for our products then they may carry excess product inventory, which could adversely affect our revenue and operating results.

If some or all of our channel partners purchase more of our products than they need to satisfy end-user demand in any particular period, inventories held by the channel partners will grow during that period. The channel partners are then likely to reduce future orders until they realign inventory levels with end-user demand, which could adversely affect our product revenue in a subsequent period.

Distributors may also return our products in exchange for other products, subject to time and quantity limitations. Our reserve estimates for products stocked by our distributors are based principally on reports provided to us by our distributors, typically on a monthly basis. To the extent this resale and channel-inventory information is inaccurate, or we do not receive it in a timely manner, we may not be able to make accurate reserve estimates for future periods, which could adversely affect our operating results.

Our growth strategy depends in part on the success of strategic relationships with third parties and their continued performance and alignment.

To continue our growth, we are investing in our relationships with SIs, VARs and software solution providers that have product offerings that complement our platform and through which we will fulfill sales. Our business will be harmed if we fail to successfully develop and implement such strategic relationships. For example, operating results may suffer if our efforts towards developing our go-to-market relationships consume resources and incur costs, but do not result in a commensurate increase in revenue. In addition, such relationships may involve exclusivity provisions, additional levels of distribution, discount pricing or investments in other companies. The cost of developing and maintaining such relationships may go unrecovered or unrewarded and our efforts may not generate a correspondingly significant increase in revenue.

Selling prices of our products could decrease substantially, which could have a material adverse effect on our revenue and gross margins.

Historically, our market has experienced price erosion. The average selling price, or ASPs, of our products has decreased as the RAIN market has developed. We may experience substantial fluctuations in future operating results due to further ASP reductions.

From time-to-time we reduce the selling prices of our products to meet end-customer demands or to respond to market pressure from our competition. For example, during the second half of 2017, competitive pressures led to larger ASP declines for our endpoint ICs than we saw in previous quarters. As the market has grown, we have generally seen competitive pressures increase. We also sometimes reduce prices to encourage adoption, address macroeconomic conditions or for other reasons. We expect to do so again in the future. If we are unable to offset ASP reductions with increased sales volumes or reduced product costs then our revenue and gross margins will suffer. Further, our customers may be slow to migrate to new, higher margin products. Some competitors have significantly greater resources than we have and may be better able to absorb the negative impact on operating results as a result of such trends.

Rapid market innovation, which we continue to experience, can drive intense pricing pressure, particularly for older products or products using older technology. Short product life cycles cause our channel partners and end users to replace older products with newer ones on a regular basis. When demand for older products declines, ASPs may drop, in some cases precipitously. To profitably sell our products we must continually improve our technology, and processes, and reduce costs in line with the lower selling prices. If we and our third-party suppliers and manufacturers cannot advance process technologies or improve efficiencies to a degree sufficient to maintain required margins, we may not be able to sell our products profitably. Should our cost reductions fail to keep pace with reductions in market prices, our business, financial condition and operating results will be materially adversely affected.

Changes in our product mix could cause our overall gross margin to decline, adversely affecting our operating results and financial condition.

We may not be able to maintain our historical gross margins. Our gross margins depend strongly on product mix. A shift in sales mix away from our higher margin products to lower margin products will adversely affect our gross margins. We generate a majority of our revenue from sales of our endpoint ICs, which have lower gross margins than our other products, and endpoint IC revenue may increase as a percentage of our total revenue over time. In addition, gross margins can be affected by endpoint IC product mix. As the market for our endpoint IC products matures, we expect to experience price erosion for those products which may adversely affect gross margins if we are not able to realize cost reductions or introduce or shift towards higher-margin products. If endpoint IC revenue grows relative to our other products, our company-wide gross margin will decline. Additionally, competitive alternatives to our products, overall increased competition, weaker than expected demand, currency exchange rates and other factors may lead to lower prices, revenue and margins in the future, adversely affecting our operating results and financial condition.

We generate most of our revenue from our endpoint ICs, and a decline in sales of these products or increased price competition in the market for endpoint ICs could adversely affect our operating results and financial condition.

We derive, and expect to continue to derive, a majority of our product revenue from our endpoint ICs. Accordingly, we are vulnerable to fluctuations in demand for our endpoint ICs, and if demand for them declines, our business and operating results will be adversely affected. In addition, the continued adoption of our endpoint ICs and maintaining demand for them and our new endpoint IC products, derives in part from our ability to continually innovate and to demonstrate the benefits of using our endpoint ICs with our reader ICs and modules, readers and gateways to achieve superior performance over our competitors. If we are not successful in establishing the benefits of using our products and platform, we may not be successful in countering competitive pressures to lower prices for our endpoint ICs and our business and operating results could be adversely affected.

Our products must meet exacting technical and quality specifications. Defects, errors or interoperability issues with our products, the failure of our products to operate as expected, or undue difficulty in deploying our products in actual operations could affect our reputation, result in significant costs to us and impair our ability to sell our products.

Our products may contain defects or errors or may not operate as we or our channel partners or end-user customers expect, which could materially and adversely affect our reputation, result in significant costs to us and impair our ability to sell our products in the future. Our products must meet demanding specifications for quality, performance and reliability. Our products are highly technical and designed to be deployed in large, complex systems under a variety of conditions. Channel partners and end users may discover errors, defects or incompatibilities only after deploying our products. For example, harsh environments or radio-frequency interference may negatively affect gateway performance. In addition, our channel partners or end users may experience compatibility or interoperability issues between our products and their enterprise software systems or networks, or between our products and other RAIN products they may use.

We may experience quality problems with our products combined with or incorporated into products from other vendors, such as tags produced by our tag OEMs using our endpoint ICs, or readers or gateways assembled by OEMs and ODMs using our reader ICs or modules. We may have difficulty identifying and correcting the source of problems when third parties are combining, incorporating or assembling our products.

If we are unable to fix errors or other problems, we could experience:

- loss of customers or customer orders;
- lost or delayed market acceptance and sales of our products;
- loss of market share;
- damage to our brand and reputation;
- impaired ability to attract new customers or achieve market acceptance;
- diversion of development resources;
- increased service and warranty costs;
- replacement costs;
- legal actions by our customers; and
- increased insurance costs.

Given the technical and business requirements against which end users evaluate RAIN and our products and platform, our business results and prospects could suffer if we are unable to make our products and our platform easy to deploy. To demonstrate the benefits of our platform, or layers of it, in fulfilling business needs and to develop deployment methods to meet those needs, we frequently enter into proof-of-concept deployments, or POCs, with prospective end users. These POCs can extend for relatively long periods of time, and their ultimate outcome can be mixed for a variety of reasons, including changes in end-user business requirements, changes in end-user commitment to the POC as well as deployment challenges. If we fail to deliver deployable solutions through POCs or otherwise, adoption of our products and platform could be adversely affected and our reputation and our business prospects could suffer.

Although our agreements typically contain provisions that purport to limit our liability for damages resulting from defects in our products, such limitations and disclaimers may not be enforceable or otherwise effectively protect us from claims. We may be required to indemnify our customers against liabilities arising from defects in our products or in their solutions that incorporate our products. These liabilities may also include costs incurred by our channel partners or end users to correct problems or replace our products.

The costs we incur correcting product defects or errors may be substantial and could adversely affect our operating results. Although we test our products for defects or errors prior to product release and during production, our customers still occasionally catch defects or errors that we miss. Such defects or errors have occurred in the past and may occur in the future. To the extent product failures are material, they could adversely affect our business, operating results, customer relationships, reputation and prospects. Also, we assert that our products conform to the UHF Gen2 protocol. Compatibility issues between our products and the protocol, or among different products that each nominally conform to the protocol, could disrupt our customers' operations, hurt our customer relations and materially adversely affect our business and prospects.

We will lose market share and may not be successful if end users or customers do not design our products into their products and systems.

End users often undertake extensive pilot programs or qualification processes prior to placing orders for large quantities of our products, in particular for reader and gateway products, because these products must function as part of a larger system or network or meet certain other specifications. We spend significant time and resources to have our products selected by a potential end user or customer, which is known as a “design-in.” In the case of reader and gateway products, a “design-in” means the product has been selected to be designed into the end user’s system and, in the case of an endpoint IC, may mean the endpoint IC has met certain unique performance criteria established by the end user or customer. If we fail to develop new products that adequately or competitively address the needs of potential end users, they may not select our products to be designed into their systems, which could adversely affect our business, prospects and operating results.

Our business is dependent upon our brand recognition and reputation, and if we fail to maintain or enhance our brand recognition or reputation, our business could be harmed.

We believe that maintaining and enhancing our brand and our reputation is critical to our relationships with our customers and end users and to our ability to attract new customers and end users. We also believe that our brand and reputation will be increasingly important as competition in our market continues to develop. Our success in this area will depend on a wide range of factors, some of which are beyond our control, including the following:

- the efficacy of our marketing efforts;
- our ability to continue to offer high-quality, innovative and defect-free products;
- our ability to maintain the security and privacy of our customers’ sensitive and proprietary information;
- our ability to retain existing customers and obtain new customers;
- our ability to maintain high customer satisfaction;
- the quality and perceived value of our products;
- our ability to successfully differentiate our products from those of our competitors;
- actions of competitors and other third parties; and
- positive or negative publicity.

If our brand promotion activities are not successful, our operating results and growth may be harmed.

Furthermore, negative publicity, whether or not justified, relating to events or activities attributed to us, employees, channel partners or others associated with any of these parties, may tarnish our reputation and reduce the value of our brand. Damage to our reputation and loss of brand equity may reduce demand for our products and platform and have an adverse effect on our business, operating results and financial condition. Moreover, any attempts to rebuild our reputation and restore the value of our brands may be costly and time consuming, and such efforts may not ultimately be successful.

If we are unable to protect our intellectual property, our business could be adversely affected.

Our success depends in part upon our ability to obtain, maintain and enforce patents, copyrights, trade secrets, trademarks and other intellectual property rights and to prevent third parties from infringing, misappropriating or circumventing the rights we own or license. Given our industry-leading innovation in RAIN technology, there is a high likelihood that material elements of our products, including our endpoint ICs have been or will be copied by competitors. We take appropriate and feasible measures to protect our intellectual property rights. However, we cannot be sure that we will be able to prevent such conduct by simply enforcing, or threatening to enforce, those rights, particularly against competitors who may have more financial and other resources to deploy against us.

We rely on a variety of intellectual property rights, including patents in the United States and copyrights, trademarks and trade secrets in the United States and foreign countries. Because many RAIN products are used in or imported into the United States, we have historically focused on filing U.S. patent applications. We have filed a small number of foreign patent applications, but the number of issued and allowed foreign patents is still small. By seeking patent protection primarily in the United States, our ability to assert our intellectual property rights outside the United States is limited. We have registered trademarks and domain names in selected foreign countries where we believe filing for such protection is appropriate. Regardless, some of our products and technologies may not be covered adequately by any patent, patent application, trademark, copyright, trade secret or domain name.

We cannot guarantee that:

- any of the patents, trademarks, copyrights, trade secrets or other intellectual property rights we presently employ in our business will not lapse or be invalidated, circumvented, challenged or abandoned;
- our intellectual property rights will provide competitive advantages to us;

- our ability to assert our intellectual property rights against potential competitors or to settle current or future disputes will not be limited by our agreements with third parties;
- any of our pending or future patent applications will be issued or have the coverage we originally sought;
- our intellectual property rights will be enforced, particularly in jurisdictions where competition may be intense or where legal protections may be weak;
- we will not lose the ability to assert our intellectual property rights against, or to license our technology to, others and collect royalties or other payments; or
- we will retain the right to ask for a royalty-bearing license in relation to ratification of a standard for which we participate in the standards process if we fail to file an intellectual property declaration pursuant to such standards process.

In addition, our competitors or others may design around our patents or protected technologies. Effective intellectual property protection may be unavailable or more limited in one or more relevant jurisdictions relative to those protections available in the United States. If we pursue litigation to assert our intellectual property rights, an adverse decision in any legal action could limit our ability to assert our intellectual property rights, limit the value of our technology or otherwise negatively impact our business, financial condition and operating results.

Monitoring unauthorized use of our intellectual property is difficult and costly. Unauthorized use of our intellectual property may have already occurred or may occur in the future. Our failure to identify unauthorized use or otherwise adequately protect our intellectual property could adversely affect our business.

Moreover, any actual or threatened litigation to enforce our intellectual property could be time consuming, distracting, expensive and could result in outcomes or trigger consequences that are harmful to us. We could incur significant costs and divert our attention and the efforts of our employees by threatening or initiating litigation. This could, in turn, result in lower revenue and higher expenses. To the extent we discuss our concerns regarding possible or actual infringement with others prior to or in lieu of litigation, we could also become subject to claims brought by alleged infringers. Because litigation outcomes are uncertain, we could lose in our enforcement action or weaken our intellectual property through the litigation process. At the same time, any decision not to enforce our intellectual property-rights through litigation could embolden others to violate or potentially violate our intellectual property rights, and thus weaken them over time.

For example, in June 2019, we filed a patent infringement lawsuit against NXP USA, Inc., a Delaware corporation and subsidiary of NXP in the U.S. District Court for the Northern District of California. Our complaint alleges that certain NXP integrated circuit products infringed and continue to infringe numerous U.S. patents owned by us. We are seeking, among other things, past damages, including lost profits, and no less than a reasonable royalty; enhanced damages for willful infringement; and reasonable attorneys' fees and costs for infringement of each of the asserted patents. We are also seeking an injunction against NXP making, selling, using, offering for sale or importing the RAIN RFID integrated circuit product NXP introduced in 2017. Regardless of the outcome, our lawsuit against NXP may increase our expenses, distract management and other key employees, negatively impact relationships with other participants in our supply chain or with customers, and could result in retaliatory claims against us. For example, in October 2019, NXP USA, Inc. and NXP filed a patent infringement lawsuit against us in the U.S. District Court for the District of Delaware. If we are unsuccessful in prosecuting our claims against NXP or in defending NXP's claims against us, or to the extent that we cannot maintain the validity and enforceability of our patents, this could have a material adverse effect on our business, results of operations and financial condition.

Additionally, some of our know-how or technology is not patented or patentable and may constitute trade secrets. To protect our trade secrets, we have a policy of requiring our employees, consultants, advisors and other collaborators to enter into confidentiality agreements. We also rely on customary contractual protections with our channel partners, suppliers and end users, and we implement security measures intended to protect our trade secrets, know-how or other proprietary information. However, we cannot guarantee we have entered into appropriate agreements with all parties that have had access to our trade secrets, know-how or other proprietary information. Moreover, the agreements we have entered into may not provide meaningful protection for our trade secrets, know-how or other proprietary information in the event of any unauthorized use or disclosure. Our trade secrets, know-how or other proprietary information could be obtained by third parties as a result of breaches of our physical or electronic security systems or our suppliers, employees or consultants could assert rights to our intellectual property.

Finally, our use of overseas manufacturers may involve particular risks. The intellectual property protection in countries where our third-party contractors operate is weaker than in the United States. If the steps we have taken and the protection provided by law do not adequately safeguard our intellectual property rights then we could suffer losses in profits due to the sales of competing products that exploit our intellectual property rights.

We may assert or face claims of intellectual property infringement which could be time consuming, costly to prosecute, defend or settle, result in the loss of significant rights, and adversely affect RAIN adoption generally.

Many companies in our industry, as well as so-called non-practicing entities, hold large numbers of patents and other intellectual property rights and may vigorously pursue, protect and enforce their intellectual property rights. We have in the past, and may in the future, receive invitations to license patent and other intellectual property rights to technologies that are important to our business. We may also receive assertions against us, our channel partners or end users claiming that we or they infringe patent or other intellectual property rights. Claims that our products, processes, technology or other aspects of our business infringe third-party intellectual property rights, regardless of their merit or resolution, could be costly to defend or settle and could divert the efforts and attention of our management and technical personnel. If we decline to accept an offer, the offering party may allege that we infringe such patents, which could result in litigation.

Intellectual property disputes affecting our industry may adversely affect RAIN adoption. For example, in 2011 Round Rock Research filed lawsuits against 11 end users, including Walmart and Macy's, for patent infringement in the RAIN products these retailers use. We believe these lawsuits materially and adversely affected demand for our products by retailers and others from 2011 to 2014. In 2013, Round Rock Research entered into licensing settlement agreements with a substantial number of RAIN vendors, including us; in early 2015, they reached a settlement agreement with the last of the end-user defendants. We, our channel partners, suppliers or end users could be involved in similar disputes in the future which would materially and adversely affect our operating results and growth prospects. We may also be forced, or choose, to take action to protect our own intellectual property against infringement by others. This too could materially and adversely affect RAIN adoption as well as our own operating and growth prospects. For example, in June 2019, we filed a patent infringement lawsuit against NXP USA, Inc., a Delaware corporation and subsidiary of NXP in the U.S. District Court for the Northern District of California and in October 2019, NXP USA, Inc. and NXP filed a patent infringement lawsuit against us in the U.S. District Court for the District of Delaware. For more information, see "—If we are unable to protect our intellectual property, our business could be adversely affected."

Many of our agreements require us to indemnify and defend our channel partners and end users from third-party infringement claims and pay damages in the case of adverse rulings. These damages could be sizable and disproportionate to the business derived from the accused channel partners or end users. Moreover, we may not know whether we are infringing a third party's rights due to the large number of RAIN-related patents or to other systemic factors. For example, patent applications in the United States are maintained in confidence for up to 18 months after filing or, in some instances, for the entire time prior to patent issuance. Consequently, we may not be able to account for such rights until after publication. Competitors may also have filed patent applications or received patents and may obtain additional patents and proprietary rights that block or compete with our patents. Claims of this sort could harm our relationships with our channel partners or end users and might deter future customers from doing business with us. We do not know whether we will prevail in any such future proceedings given the complex technical issues and inherent uncertainties in intellectual property litigation. If any pending or future proceedings result in an adverse outcome, then we could be required to:

- cease the manufacture, use or sale of the infringing products, processes or technology;
- pay substantial damages for infringement;
- expend significant resources to develop non-infringing products, processes or technology;
- license technology from the party claiming infringement, which license may not be available on commercially reasonable terms, or at all;
- cross-license our technology to a competitor to resolve an infringement claim, which could weaken our ability to compete with that competitor; or
- pay substantial damages to our channel partners or end users to cause them to discontinue their use of, or replace, infringing products with non-infringing products.

Any of the foregoing results could have a material adverse effect on our business, financial condition and operating results.

We have limited visibility into the length of the sales and deployment cycles for our products.

Because we have limited sales history for our products, we have limited visibility into the lengths of the product sales and deployment cycles, and from time-to-time these cycles have been longer than we anticipated. For new types of products, such as our gateways and ItemSense software, our visibility into the sales and deployment cycle lengths is even more limited; inasmuch as these products are components in a systems sale, our experience in the systems-selling cycle is even more limited. Numerous factors can contribute to uncertainties in the cycle lengths, including the time channel partners and end users spend evaluating our products, our time educating them on the products' benefits, and our time integrating our systems with their systems. The length and uncertain timing of the sales and deployment cycles can lead to delayed product orders. In anticipation of product orders, we may incur substantial costs before the sales cycle is complete and before we receive any customer orders or payments. If a sale is not completed or is cancelled or delayed, we may incur substantial expenses, which could hinder our ability to achieve or maintain profitability or otherwise negatively affect our financial results.

Significant developments stemming from the current U.S. presidential administration's priorities or initiatives, or the U.K.'s referendum on membership in the EU could have a material adverse effect on us.

The current U.S. presidential administration has pursued trade policy that is starkly different from past administrations. Its actions have included withdrawing the United States from negotiations for the TPP; renegotiating NAFTA; announcing and imposing tariffs on a wide variety of trading partners including, as of the date of this report, tariffs on up to \$200 billion of goods imported into the United States from China; proposing restrictions on free trade generally and immigration to the United States. Changes in U.S. social, political, regulatory and economic conditions or in laws and policies governing foreign trade, manufacturing, development and investment in the territories and countries where we currently develop and sell products, and immigration to the United States, and any negative sentiments towards the United States as a result of such changes, including our trading partners potentially imposing tariffs on imports of U.S. products, could materially affect our business or the businesses of our customers or end users, which in turn could result in weakening demand by our customers or end users for our products. In addition, negative sentiments towards the United States among non-U.S. customers and among non-U.S. employees or prospective employees, or the imposition of restrictions on immigration to the United States, could adversely affect sales or hiring and retention, respectively. To the extent U.S. policies engender an economic downturn, in the United States or abroad, the effects could materially affect our business or the businesses of our customers or end users in many ways, only some of which we can identify as of the date of this report.

In August 2018, the United States imposed tariffs on products manufactured in China. This tariff affects certain pre-Monza R6 endpoint IC wafer SKUs that our inlay partners import into, and process in, the United States. If we are unable to work with our supply chain and sourcing options to implement a long-term strategy for mitigating the impact of tariffs on imports our business could be adversely impacted.

In June 2016, the United Kingdom held a referendum and voted in favor of leaving the European Union, or EU, and in March 2017 the United Kingdom began the official process to leave the EU. The timing of the United Kingdom's exit from the EU remains uncertain; the EU has extended the deadline for the United Kingdom's exit from the EU until January 31, 2020. Negotiations related to the United Kingdom's departure from the EU have created political and economic uncertainty, particularly in the United Kingdom and the EU, and this uncertainty may last for years. Our business in the United Kingdom, the EU and worldwide could be affected during this period of uncertainty, and perhaps longer, by the impact of the United Kingdom's decision to leave the EU. There are many ways in which our business could be affected, only some of which we can identify as of the date of this report.

The withdrawal of the United Kingdom from the EU, along with events that could occur in the future as a consequence of the United Kingdom's withdrawal, including the possible breakup of the United Kingdom, may cause significant volatility in global financial markets, including in global currency and debt markets. This volatility could cause a slowdown in economic activity in the United Kingdom, Europe or globally, which could adversely affect our operating results and growth prospects. In addition, our business could be negatively affected by new trade agreements between the United Kingdom and other countries, including the United States, and by the possible imposition of trade or other regulatory barriers in the United Kingdom. Furthermore, we currently operate in Europe through an Impinj subsidiary based in the United Kingdom, which currently provides us with certain operational, tax and other benefits. The United Kingdom's withdrawal from the EU could adversely affect our ability to realize those benefits and we may incur costs and suffer disruptions in our European operations as a result. These possible negative impacts, and others resulting from the United Kingdom's withdrawal from the EU, may adversely affect our operating results and growth prospects.

We are subject to order and shipment uncertainties. Inaccuracies in our estimates of end-customer or channel-partner demand and product mix, or unexpected external events, could negatively affect our inventory levels, sales and operating results.

Our ability to accurately plan purchases or manufacturing is limited because lead times for our products can be lengthy and our ability to accurately forecast near-term demand for our products is limited, potentially causing us to have either excess or inadequate inventory, to lose sales, or to reduce our profit margins. High inventory levels and potential obsolescence could result in unexpected expenses or increases in reserves that could adversely affect our business, operating results and financial condition. Low inventory levels could cause us to lose sales, market share or damage our customer relationships.

We sell our products primarily through channel partners, and we derive revenue primarily from purchase orders rather than from long-term purchase commitments. To ensure product availability, we typically manufacture from channel-partner forecasts in advance of received purchase orders. However, many of our channel partners have difficulty accurately forecasting end-user demand for our products and the timing of that demand. In addition, when we release new products, we may carry higher inventories or have slower inventory turnover depending on our ability to anticipate market acceptance.

Additional uncertainty arises from competitive business practices and from external events. Our channel partners can cancel purchase orders or defer product shipments, in some cases with little or no advance notice to us. Additionally, we sometimes receive soft commitments for larger order sizes which do not materialize. Moreover, external events such as changes in regulatory standards or the timing of such changes can adversely affect demand and consequently our inventory levels, sales and operating results.

We are subject to risks inherent in foreign operations, including social, political and economic flux and compliance with additional U.S. and international laws, including those related to anti-bribery and anti-corruption, and may not be able to successfully maintain or expand our international operations.

In 2018, we derived 76% of our total revenue from sales outside the United States. We anticipate growing our business, in part, by continuing to expand our international operations, which involves a variety of risks, including:

- changes, some unexpected or unanticipated, in regulatory requirements, taxes, trade laws, tariffs, export quotas, custom duties or other trade restrictions;
- lack of established, clear, or fairly implemented standards or regulations with which our products must comply;
- greater difficulty in enforcing contracts, judgments and arbitration awards in international courts, and in collecting accounts receivable and longer payment and collection periods;
- difficulty in supporting and localizing our international products;
- different or unique competitive pressures as a result of, among other things, the presence of, or preference for, local businesses and market players;
- challenges in managing employees, some foreign nationals, over large geographic distances, including the need to implement appropriate systems, policies, benefits and compliance programs;
- challenges in doing business in different languages and in business cultures with varying norms of transparency and compliance with policies than in the United States;
- limited or unfavorable intellectual property protection;
- misappropriation of our intellectual property;
- inflation and fluctuations in foreign currency exchange rates and interest rates;
- withholding taxes or other taxes, or changes thereof, on our foreign income;
- restrictions, or changes thereof, on foreign trade or investment, including currency-exchange controls;
- changes in a country's or region's political, regulatory, legal or economic conditions;
- political uncertainty, strife, unrest, or conflict;
- differing regulations with regard to maintaining operations, products and public information;
- inequities or difficulties obtaining or maintaining export and import licenses;
- differing labor regulations, including where labor laws may be more advantageous to employees than in the United States
- restrictions on earnings repatriation;
- corrupt or unethical practices in foreign jurisdictions that may subject us to exposure under applicable anti-corruption and anti-bribery laws such as the Foreign Corrupt Practices Act and the United Kingdom Bribery Act of 2010, or U.K. Bribery Act; and
- regulations, and changes thereof, relating to data privacy and the unauthorized use of, or access to, commercial and personal information, particularly in Europe.

Various foreign regulatory or other governmental bodies may issue rulings that invalidate prior laws, regulations, or legal frameworks in manners that may adversely impact our business. The Court of Justice of the European Union in October 2015 issued a ruling immediately invalidating the EU-U.S. Safe Harbor Framework, which facilitated personal data transfers to the United States in compliance with applicable EU data protection laws. EU and U.S. political authorities adopted the EU-U.S. Privacy Shield in 2016, providing a mechanism for companies to transfer EU personal data to the United States. It is unclear as of the date of this report whether we will make use of the EU-U.S. Privacy Shield, and it has been subject to challenges in EU courts. In view of these developments, there is significant regulatory uncertainty surrounding the future of data transfers from the European Economic Area to the United States. In addition, the European Commission adopted the General Data Protection Regulation, or GDPR, which became effective on May 25, 2018. The GDPR imposes more stringent data-protection requirements than the former regulatory regime in the EU and provides for greater penalties for noncompliance of up to the greater of 4% of worldwide annual revenue or €20 million. Additionally, the United Kingdom enacted the Data Protection Act 2018 in May 2018 that substantially implements GDPR, but as of the date of this report, it remains uncertain how data protection laws or regulations will develop in the United Kingdom in the medium to longer term and how data transfers to and from the United Kingdom will be regulated. The June 2016 approval by voters of a referendum to leave the EU, and the UK's anticipated exit from the EU in 2019, has created uncertainty with regard to data transfers between the UK, the EU, and other jurisdictions, and could require us to make additional changes to the way we conduct our business and transmit data between the U.S., the UK, the EU, and the rest of the world. Likewise, the California Consumer Privacy Act of 2018, or CCPA, will become effective on January 1, 2020. The CCPA imposes stringent data privacy and data protection requirements for the data of California residents, and provides for penalties for noncompliance of up to \$7,500 per violation. It remains unclear how various provisions of the CCPA will be interpreted and enforced. The effects of this legislation potentially are far-reaching and may require us to modify our data processing practices and policies and to incur substantial costs and expenses in an effort to comply.

We opened an office in Shanghai, China in 2011. In addition to the risks listed above, we are also exposed to risks associated with changes in laws and policies governing Chinese operations and, to a lesser extent, changes in U.S. laws and regulations relating to foreign trade and investment, such as those described under the caption “—We are subject to governmental export and import controls that could subject us to liability or impair our ability to compete in international markets.” To date, legal, policy or regulatory changes have not had a material adverse effect on our business or financial condition, but they may not in the future. We may experience increased costs for, or significant impact to, our Chinese operations in the event of changes in Chinese government policies or political unrest or unstable economic conditions in China. The nationalization or other expropriation of private enterprises by the Chinese government could result in total loss of our China investment. Any of these matters could materially and adversely affect our business and results of operations.

Failure to comply with anti-corruption and anti-bribery laws in our foreign activities could subject us to penalties and other adverse consequences. Anti-corruption and anti-bribery laws generally prohibit companies and their employees and intermediaries from making payments to foreign officials for the purpose of obtaining or keeping business, securing an advantage or directing business to another person, and require companies to maintain accurate books and records and a system of internal accounting controls. Under the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA, U.S. companies may be held liable for corrupt actions taken by directors, officers, employees, agents, or other strategic or local partners or representatives. If we, our intermediaries or our solution providers, SIs, OEMs, VARs, distributors, tag manufacturers, and other channel partners fail to comply with FCPA requirements or similar legislation, government authorities in the United States and elsewhere could seek to impose civil or criminal fines and penalties which could have a material adverse effect on our business, operating results and financial conditions. Moreover, China is an area of heightened exposure regarding compliance with anticorruption laws such as the FCPA and the U.K. Bribery Act. We intend to increase our international sales and business there and, as such, our risk of violating laws such as the FCPA or U.K. Bribery Act also increases.

We have limited experience marketing, selling and supporting our products and services abroad and may not be able to increase or maintain international market demand for our products. In addition, regulations or standards adopted by other countries may require us to redesign existing products or develop new products for those countries. For example, foreign governments may impose regulations or standards with which our current products do not comply or may require operation in frequency bands in which our products do not operate. Furthermore, if we are unable to expand international operations in a timely and cost-effective manner in response to increased demand, we could miss sales opportunities and our revenue may decline, adversely affecting our operating results, business and prospects. If we invest substantial time and resources but are unable to expand our international operations successfully and in a timely manner, our business, prospects and operating results will suffer.

We generally conduct our China operations through a wholly owned subsidiary and our European operations through our U.K. subsidiary. We generally report our taxable income in worldwide jurisdictions based on our business operations in those jurisdictions. The relevant taxing authorities may disagree with our determinations as to the income and expenses attributable to the jurisdiction or subsidiary. In the event of a disagreement, if our position was not sustained, we could be required to pay additional taxes, interest and penalties, which could result in tax charges, higher effective tax rates, reduced cash flows and lower overall profitability.

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

The U.S. and various foreign governments have imposed controls, export license requirements and restrictions on the import or export of certain products, technologies and software. We must export our products in compliance with U.S. export controls, including the Commerce Department’s Export Administration Regulations and various economic and trade sanctions established by the Treasury Department’s Office of Foreign Assets Controls. We may not always be successful in obtaining necessary export licenses, and our failure to obtain required import or export approval for our products or limitations on our ability to export or sell our products imposed by these laws may harm our international and domestic sales and adversely affect our revenue. Noncompliance with these laws could have negative consequences, including government investigations, penalties and reputational harm.

Changes in our products or changes in export, import and economic sanctions laws and regulations may delay our introduction of new products in international markets, prevent our customers from deploying our products internationally or, in some cases, prevent the export or import of our products to or from certain countries altogether. The U.S. government has imposed significant tariffs on a variety of items imported from China. China has responded by imposing significant tariffs on the import of items from the United States. Such tariffs could have a material impact on the cost of our products and decrease our ability to sell our products to existing or potential customers and harm our ability to compete internationally. Further, it is possible that additional sanctions or restrictions may be imposed by the U.S. government on items imported into the United States from China and any such measures could further adversely affect our ability to sell our products to existing or potential customers and harm our ability to compete internationally and grow our business. Any change in export or import regulations or legislation, shift or change in enforcement, or change in the countries, persons or technologies targeted by these regulations, could result in decreased use of our products by, or in our decreased ability to export or sell our products to, existing or potential customers with international operations. In such event, our business and results of operations could be adversely affected.

Instability or deterioration in the political, social, business or economic conditions in key production jurisdictions could harm our business, financial condition and operating results.

We outsource manufacturing and production of our hardware products to suppliers in a limited number of jurisdictions, some of which experience significant and abrupt political, social, business or economic change. These jurisdictions include Thailand, Malaysia, Taiwan and China, which have experienced significant change in political, social, business or economic conditions in the past and may experience them in the future.

For example, we post-process many of our IC wafers, including testing, dicing and other wafer operations, using subcontractors in Bangkok, Thailand. Thailand has experienced ongoing political and social upheaval over the past two decades. In May 2014, the Royal Thai Army staged a military coup, banned demonstrations and enforced monitoring of civilian activities. In August 2014, Thailand's national assembly appointed the coup leader as prime minister and in August 2016, Thai voters adopted via referendum a new constitution drafted by Thailand's interim government. In October 2016, Thailand's king died after a 70-year reign and was succeeded by his son, but political instability persists.

Deterioration in the political, social, business and economic conditions in any jurisdictions in which we have significant suppliers could slow or halt product shipments or disrupt our ability to test or post-process products. In such an eventuality, we could be forced to transfer our manufacturing, testing and post-processing activities to more stable, and potentially more costly regions or find alternative sources, which could harm our business, financial condition and operating results.

Intellectual property licensing from or to others, including competitors, may subject us to requirements or limitations that could adversely affect our business and prospects.

We have intellectual property license agreements that give us access to certain patents and intellectual property of others. We have not licensed our patents or intellectual property to others except as necessary for our customers to practice their business using our products and as required pursuant to agreements that we have entered into in connection with our participation in the development of GS1 EPCglobal protocols and ISO standards. In the course of our participation in the development of GS1 EPCglobal protocols, including UHF Gen2, UHF Gen2 V2, tag data standards, low-level reader protocol, and others, we have agreed to license on a royalty-free basis those of our patents that are necessarily infringed by the practice of these protocols to other GS1 EPCglobal members, subject to reciprocal royalty-free rights from those other members. Because it may not be clear whether a member's intellectual property is necessary or optional to the practice of a protocol, disputes could arise among members, resulting in our inability to receive a license on royalty-free terms. Further, some GS1 EPCglobal members declined to provide licenses to some of their intellectual property under royalty-free terms, instead choosing reasonable and nondiscriminatory, or RAND, terms. Disputes or confusion may arise about whether we may invoke our necessary intellectual property if these members choose to assert their RAND intellectual property, potentially causing or at least complicating any ensuing litigation and harming our business, financial condition and operating results.

In the course of our participation in the development of certain ISO standards we have agreed to grant to all users worldwide a license to those of our patents that are necessarily infringed by the practice of those standards, including at frequencies other than UHF, on RAND terms, again subject to reciprocity. As a result, we are not always able to limit to whom and, to a certain extent, on what terms we license our technologies, and our control over and our ability to generate licensing revenue from some of our technologies may be limited. We may choose to license our patents or intellectual property to others in the future. We cannot guarantee that any patents and technology that we provide in such future licenses will not be used to compete against us.

We rely on third-party license agreements; impairment of those agreements may cause production or shipment delays that could harm our business.

We have licensing agreements with other entities for patents, software and technology used in our manufacturing operations and products. For example, we license tools from design-automation software vendors to design our silicon products. Third-party licenses for patents, software and other technology important to our business may not continue to be available on commercially reasonable terms, if at all. Loss of any such licenses could cause significant manufacturing interruptions, delays or reductions in product shipments until we can develop, license, integrate, and deploy alternative technologies, if even possible, which would materially harm our business and operating results.

Our use of open-source software may expose us to additional risks and harm our intellectual property.

Our products, processes and technology sometimes use or incorporate software that is subject to an open-source license. Open-source software is typically freely accessible, usable and modifiable, and is made available to the general public on an “as-is” basis under the terms of a nonnegotiable license. Use and distribution of open-source software may entail greater risks than use of third-party commercial software. Certain open-source software licenses require a user who intends to distribute the open-source software as a component of the user’s software to disclose publicly part or all of the user’s source code. In addition, certain open-source software licenses require the user of such software to make derivative works of the open-source code available to others at low or no cost. Consequently, open-source licensing can subject our previously proprietary software to open-source licensing terms, which could enable our competitors to create similar offerings with lower development effort and time and ultimately could result in a loss of sales. In addition, open-source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of their code, opening us to business risks that could materially harm our operating results.

We may face claims alleging noncompliance with open-source license terms or infringement or misappropriation of proprietary software. These claims could result in litigation, require us to purchase a costly license, or require us to devote research and development resources to change our software, any of which would have a negative effect on our business and operating results. Few courts have interpreted open-source licenses, and these licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our offerings. In addition, if there are changes in the licensing terms for the open-source software we use, we may be forced to re-engineer our solutions, incur additional costs or discontinue sale of our offerings. We cannot guarantee that we have incorporated all open-source software in our software in a manner that is consistent with our current policies and procedures, or in a manner that will not subject us to liability.

Privacy and security concerns relating to RAIN could damage our reputation and deter current or potential customers from using our products.

Privacy advocates and others have raised and may continue raising concerns about RAIN compromising consumer privacy or facilitating theft. These concerns include unauthorized parties collecting personally identifiable information or personal data, tracking consumers, stealing identities or causing other issues relating to privacy or data protection. Consumers may be subject to unauthorized readers or gateways surreptitiously identifying and tracking their RAIN tags to gain information a consumer considers private, even if the consumer employs protective measures. Retailers may inadvertently or perhaps even intentionally read consumers’ tags to gain information, such as shopping behavior, that may be illegal to collect, or if not illegal, may be considered intrusive by consumers. Unauthorized readers or gateways could gain access to sensitive information stored in tags despite measures designed to thwart such unauthorized access. For example, criminals seeking to divert or steal high-value pharmaceutical products could seek to identify these products by looking for tags with Electronic Product Codes, or EPCs, corresponding to these products. If such concerns increase, or if actual malicious or inadvertent breaches of privacy or theft occur or are perceived to have occurred, then our reputation could be damaged, our business and prospects may suffer, and we could incur significant liability.

In addition to concerns over privacy or theft, it may be possible for those with malicious intent to misuse RAIN in ways that actually facilitate theft or damage the public trust, such as by changing the EPC on a narcotic to misrepresent it as an over-the-counter product. It may even be possible to embed computer viruses or other malicious code into endpoint ICs so that by reading endpoint IC memory, the malicious code can be inserted into end-user systems. More generally, we are vulnerable to software bugs, computer viruses, break-ins, phishing attacks, employee errors or malfeasance, attempts to overload our servers with denial-of-service or other attacks and similar disruptions from unauthorized use of our computer systems. The security measures we use to detect unauthorized activity and prevent or minimize security breaches may not function as expected or may not be sufficient to protect against certain attacks. Additionally, we may face delays in identifying or responding to security breaches or other security incidents. If a breach or other security incident occurs or is perceived to occur, customer or end-user data, other personally identifiable information or other confidential information could be accessed, obtained, or used without authorization, our and our customers' operations could be disrupted, and our customers or we could be the target of regulatory investigations or proceedings and private claims, demands, or litigation, and we could face potential liability and significant costs and expenses to remediate and otherwise take action in response to the incident. In such cases in which a customer is the target of a regulatory action or private lawsuit, such customer might allege that our products did not function as promised and may sue us for breach of contract, breach of warranty, negligence or another cause of action. Additionally, if our customers' security measures are breached or are perceived to have been breached, even if through means beyond our control, our reputation may be damaged, we may be subject to claims, demands, or litigation and our business and prospects could suffer. Moreover, concerns about security and privacy risks, even if unfounded, could damage our reputation and operating results and could delay the development of the overall RAIN industry. Even if our products meet new or changed standards or regulations, if our security measures are breached or perceived to have been breached as a result of third-party action, our error or criminal act or otherwise, and, as a result, someone obtains or is perceived to have obtained unauthorized access to customer or end-user data, personal data, personally identifiable information, or other confidential information, our reputation could be damaged, our business and prospects may suffer, and we could incur significant liability. We also could be required to expend significant capital and other resources to address any data security incident or breach and to implement measures in an effort to prevent further breaches or incidents.

In addition, we cannot assure that any limitation of liability provisions in our customer and user agreements, contracts with third-party vendors and service providers or other contracts would be enforceable or adequate or would otherwise protect us from any liabilities or damages with respect to any particular claim relating to a security breach or other security-related matter. While our insurance policies include liability coverage for certain of these matters, if we experienced a widespread security breach or other incident that impacted a significant number of our customers to whom we owe indemnity obligations, we could be subject to indemnity claims or other damages that exceed our insurance coverage. We also cannot be certain that our insurance coverage will be adequate for data handling or data security liabilities actually incurred, that insurance will continue to be available to us on economically reasonable terms, or at all, or that any insurer will not deny coverage as to any future claim. The successful assertion of one or more large claims against us that exceed available insurance coverage, or the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, could have a material adverse effect on our business, including our financial condition, operating results and reputation.

Government regulations and guidelines and other standards relating to consumer privacy may adversely impact adoption of our products, require us to make design changes or constrain our ability to implement new and desired product features.

Our customers are subject to laws and regulations related to collecting, storing, transmitting and using personal information and personal data, as well as additional laws and regulations that address privacy and security issues related to radiofrequency identification, or RFID. For example, some U.S. states have enacted statutes specifically governing the use of RFID, including prohibitions on mandatory implantation of an RFID IC, unauthorized skimming of information from ID cards and documents, unauthorized personnel tracking using RFID and improper use of RFID tags in drivers' licenses or on vehicles. Because RAIN uses RFID technology, we believe these statutes and regulations apply to RAIN systems.

The European Commission, or EC, has issued guidance to address privacy concerns about RFID. In May 2009, the EC issued a recommendation that retail companies in the EU inform their customers when RFID tags are either on or embedded within products. In April 2011, the EC signed a voluntary agreement with private and public stakeholders to develop privacy guidelines for companies using RFID in the EU. The agreement requires companies to conduct privacy impact assessments of new RFID applications and to take measures to address risks identified by the assessment before the RFID application is deployed. While compliance with the guidelines is voluntary, our customers that do business in the EU may have a preference for products that comply with the guidelines. If our RAIN products do not provide the necessary functionality to allow customers to comply with the guidelines, then our business may suffer.

The data security and privacy legislative and regulatory landscape in the United States and EU, and other foreign jurisdictions is evolving, and new or changed laws, regulations, guidelines and other standards may adversely impact our business, including our ability to develop future products. If we fail to develop products that implement end-user privacy requirements then end users may choose not to use our products in certain applications, which would harm our business, operating results and financial condition.

Although the Gen2 V2 protocol described below includes features for addressing consumer privacy and authenticating a tag, a third party may still breach these features, including as implemented in our products, in which case our reputation could be damaged, and our business and prospects may suffer.

Alternative technologies or standards, or changes in existing technologies or standards, may adversely affect RAIN market growth and our business.

Technology developments may affect our business in ways we cannot anticipate. Breakthroughs in legacy RFID technologies or markets, including those using low frequency or high frequency technology, could adversely affect RAIN market growth generally and demand for our products in particular. For example, NFC technology, which today addresses a different market than RAIN, could, with breakthrough innovations, compete with RAIN in item tagging. Likewise, new technologies such as organic transistors may allow lower-cost ICs than our current silicon-based technology allows. These competing technologies could use intellectual property that is either not royalty free or to which we do not have access. If we are unable to innovate using new or enhanced technologies or processes or are slow to react to changes in existing technologies or in the market, or have difficulty competing with advances in new or legacy technologies, then our development of new or enhanced products could be materially impacted and potentially result in product obsolescence, decreased revenue and reduced market share.

To encourage widespread RAIN market adoption, we have participated in the development of industry standards, and we have designed our products to comply with these standards. In 2013, GS1 EPCglobal ratified “UHF Gen2 Version 2” or simply “Gen2 V2,” a new version of the protocol that underlies RAIN communications. In the future, we could lose our position in GS1 EPCglobal or we could lose our project-editorship role for Gen2. If one of our competitors introduces a Gen2 V2 product that gains market adoption before we do, we could lose market share and face difficulty selling our products. The introduction of new industry standards, or changes to existing industry standards, could make our products incompatible with the new or changed standards and could cause us to incur substantial development costs to adapt to these new or changed standards, particularly if they were to achieve, or be perceived as likely to achieve, greater penetration in the marketplace. If Gen2 V2 diverges significantly from our or the RAIN market’s needs then our products may likewise fail to keep pace with the market, our competitors’ products and end-user requirements, in which case end users could delay RAIN adoption. Moreover, the adoption or expected adoption of new or changed standards could slow the sale of our existing products before products based on the new or changed standards become available. New industry standards or changes to existing standards could also limit our ability to implement new features in our products if those features do not meet the new or changed standards. The lost opportunities as well as time and expense required for us to develop new products or change our existing products to comply with new or changed standards could be substantial, and we may not successfully develop products that comply with new or changed standards. If we are not successful in complying with any new or changed industry standards, then we could lose market share, causing our business to suffer.

We are a founding member of the RAIN Alliance, an industry organization that promotes RAIN technology and solutions globally. Our chief executive officer is presently an Alliance Director and was previously the Alliance Chairman. Board membership is an elected position that we could lose in future elections; and it provides industry stature and attendant benefits but is not without risk. If the RAIN market falters, or if the RAIN Alliance falters, then we could be blamed, our reputation and industry position could be impacted, and our business could suffer.

In addition, certain organizations develop technical specifications for RAIN tags and test those tags against those specifications. For example, the ARC Program at Auburn University, or ARC, is a resource for end users in retail, aviation and manufacturing to develop performance and quality requirements that an RFID tag needs to meet for deployments specified by those end users. Certain participants in the RAIN market are sponsors of ARC, but we are not among them. A limited number of organizations other than ARC perform this function as well. While it has not occurred to date, ARC or a similar organization could develop specifications that few or none of our endpoint ICs meet, which could adversely affect our business.

Compliance with, and changes in, government spectrum regulations could adversely affect our ability to sell products and impair our operating results.

Government radio regulations require that our readers and gateways be certified for spectral compliance in jurisdictions where they are sold or operated. Our readers and gateways are collectively certified for use in more than 40 countries worldwide, including the United States, Canada, Mexico, China, Japan, South Korea and every country in the EU. If one of our reader or gateway products is found to be noncompliant despite having such certification then we could be required to modify field-deployed readers or gateways to regain certification and could spend significant resources as well as miss sales opportunities in the process. Our revenue could decline, adversely affecting our operating results, financial condition, business and prospects.

Additionally, government regulations may change, possibly without sufficient advance notice, requiring us to redesign our products to conform with the new regulations or constraining our ability to implement new features into our products, thereby causing us to incur significant expenses. These expenses include costs associated with obsolete inventory. Regulatory changes may also cause us forego opportunities to improve our products, potentially delaying our time-to-market and adversely affecting our operating results, financial condition, business and prospects.

Our products may cannibalize revenue from each other, which could harm our business.

Sales of some of our products enable our channel partners to develop their own products that compete with other of our products. For example, sales of our reader ICs allow technology companies to build and sell readers and gateways that compete with our products. Similarly, sales of our readers allow our channel partners to build and sell products that compete with our xPortal, xArray and xSpan. We even see cannibalization within our own product line—for example, our xSpan sometimes competes with our xPortal. In the future, we may see one product line expand at the expense of another, or we may be asked by channel partners to disadvantage or divest a product line. We cannot predict whether we can manage such conflicts in the future or retain channel partners despite conflicts. Any of the foregoing could have a material adverse effect on our business, financial condition and operating results.

Acquisitions could result in operating difficulties, dilution and other harmful consequences.

We have evaluated, and expect to continue evaluating, potential strategic transactions, and we may pursue one or more transactions, including acquisitions. We have limited experience executing acquisitions. Any transaction could be material to our financial condition and operating results. Integrating an acquired company, business or technology may create unforeseen operating difficulties and expenditures. Acquisition-related risks include:

- diverting management time and focus from operating our business to acquisition integration;
- difficulties integrating acquired products into our strategy and product plans;
- customers switching from us to new suppliers because of the acquisition;
- inability to retain employees from the business we acquire;
- challenges associated with integrating employees from the acquired company into our organization;
- difficulties integrating accounting, management information, human resource and other administrative systems to permit effective management of the business we acquire;
- potential requirements for remediating controls, procedures and policies appropriate for a public company in the acquired business that prior to the acquisition lacked these controls, procedures and policies;
- potential liability for past or present environmental, hazardous substance, or contamination concerns associated with the acquired business or its predecessors;
- possible write-offs or impairment charges resulting from the acquisition; and
- unanticipated or unknown liabilities relating to the acquired business.

Foreign acquisitions involve additional risks beyond those above, including risks related to integrating operations across different cultures and languages, currency risks and the economic, political and regulatory risks associated with other countries. Also, the anticipated benefit of any acquisition, domestic or foreign, may not materialize. Future acquisitions or dispositions could result in potentially dilutive issuances of our equity securities, debt incurrence, contingent liabilities or amortization expenses or goodwill write-offs, any of which could harm our financial condition. Future acquisitions may require us to obtain additional equity or debt financing, which may not be available on favorable terms or at all.

Our business could be adversely affected if one or more members of our executive management team departed.

Our success depends, in large part, on the continued contributions of our executive management team including Chris Diorio, Ph.D., our chief executive officer and Eric Brodersen, our chief operating officer. None of our executive management team is bound by employment contracts to remain with us for a specified period of time. The loss of any member of our executive management team could harm our ability to implement our business strategy and respond to the rapidly changing market conditions in which we operate.

If we are unable to attract, train and retain qualified personnel, especially technical, sales and marketing personnel, then we may not be able to effectively execute our business strategy.

Our success depends on our ability to attract, motivate and retain qualified personnel. Our technical personnel, the source of our technical and product innovations, and our sales and marketing personnel that drive our go-to-market initiatives are especially important. There is no guarantee we can attract and retain such personnel as we continue to pursue our business strategy. The availability of, and competition for, qualified personnel in the Seattle area, where we are headquartered, constrains our ability to attract qualified personnel. The loss of the services of one or more of our key employees, or our inability to attract, retain and motivate qualified personnel could have a material adverse effect on our business, financial condition and operating results.

Pricing and other provisions in our customer agreements could adversely affect our operating results.

In the ordinary course of business, we enter into agreements containing pricing terms that could, in some instances, adversely affect our operating results and gross margins. For example, some contracts specify future reader, gateway or IC pricing, or contain most-favored customer pricing for certain products. Other agreements contain exclusivity terms that prevent us from pursuing certain business with other customers during the exclusivity period. Reducing prices or offering other favorable terms to one customer could adversely affect our ability to negotiate favorable terms with other customers. For competitive or strategic reasons, we may decide to enter into agreements containing these types of provisions, and this could impair our operating results.

We and our suppliers are subject to environmental laws and regulations that could impose substantial costs on us and may adversely affect our business, operating results and financial condition.

Some of our facilities, including those devoted to research and development, are regulated under federal, state, local, foreign and international environmental laws. Those laws govern pollutant discharge into air and water; managing, disposing, handling, labeling, and exposure to hazardous substances/wastes; and contaminated site cleanup. We could incur costs, fines and civil or criminal sanctions; third-party property damage or personal-injury claims; or could be required to pay substantial investigation or remediation costs if we were to violate or become liable under environmental laws. Liability under certain environmental laws can be joint and several and without regard to comparative fault. In addition, some of our products contain hazardous substances and are subject to requirements that regulate their content, such as the EU's Restriction of Hazardous Substances Directive and analogous regulations elsewhere. Although we design our products to be compliant with environmental regulations and require our third-party contractors to comply, we cannot guarantee that we or our products will always comply with these requirements. Environmental laws also tend to become more stringent over time, and we cannot predict the ultimate costs under environmental laws or the timing of these costs. Failure to comply with these and other environmental laws could result in fines, penalties and decreased revenue, which could adversely affect our operating results.

If our third-party contractors fail to operate in compliance with environmental requirements, properly dispose of wastes associated with our products, or comply with requirements governing the hazardous-substance content of our products, we could be held liable or suffer reputational harm.

We may not sustain or effectively manage our growth.

While we have experienced significant revenue growth for periods of time, we may not experience similar growth rates in future periods. In fact, in the fourth quarter of 2017 and first and second quarters of 2018, our revenue declined compared to the same quarter a year earlier. You should not rely on our operating results for any prior periods as an indication of our future operating performance. If we are unable to maintain adequate revenue growth, then our financial results could suffer, and our stock price would decline.

To manage our growth and the responsibilities of being a public company, we believe we must effectively:

- recruit, hire, train and manage qualified engineers for our research and development activities;
- add sales and marketing personnel and expand our customer-support offices;
- implement and improve administrative, financial and operational systems, procedures and controls;
- integrate and train new employees quickly and effectively; and
- coordinate growth among our executive, engineering, finance, marketing, sales, operations and customer-support organizations.

All the above activities add to our organizational complexity and increase our operating expenses.

We may have insufficient management capabilities or resources to manage our growth and business effectively. Because of our small management team, we may be unable to pursue all commercial opportunities. Accordingly, we may require significant additional resources as we increase the complexity and scale of our business operations. We may not have adequate resources when we need them, or we may not have sufficient capital to fund our resource needs. If we are unable to manage our growth effectively, we may not be able to exploit market opportunities or develop new products, and we may fail to satisfy customer requirements, maintain product quality, execute our business plan or respond to competitive pressures.

Our management has limited public-company experience. We are subject to additional regulatory compliance requirements, including Section 404 of the Sarbanes-Oxley Act of 2002. If we fail to maintain an effective system of internal controls, we may not be able to accurately report our consolidated financial results or prevent fraud. We previously identified a material weakness in our internal control over financial reporting.

We have a short history of operating as a public company. Some of our executive team, including our chief executive officer, have never managed a publicly traded company prior to our initial public offering and have little experience complying with the complex and everchanging laws pertaining to public companies. In addition, our chief financial officer resigned from our company effective March 30, 2018 and we are in process of identifying a replacement. Our management team as well as other company personnel devote substantial time to compliance yet may not effectively or efficiently manage our maturation as a public company. Additionally, we have incurred and will continue to incur significant legal, accounting and other expenses related to compliance with laws, regulations and standards applicable to public companies.

We expect rules and regulations such as the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, to continue to increase our legal and finance compliance time and costs, and to increase the time and costs of other activities. For example, Section 404 of the Sarbanes-Oxley Act requires that management report on, and after we cease to qualify as an emerging growth company, that our independent registered public accounting firm attest to, the effectiveness of our internal control over financial reporting. Effective internal controls are necessary for us to provide reliable financial reports and prevent fraud. Section 404 compliance will continue to divert resources and take significant time and effort to complete. We may be unable to successfully complete the procedures and certification and attestation requirements of Section 404 in a timely manner. In addition, the Sarbanes-Oxley Act requirements may be modified, supplemented or amended from time to time. Implementing the changes may take significant time and may require additional employee compliance training. We may discover internal controls that need improvement. Our or our independent registered public accounting firm's discovery of a material weakness, even if quickly remedied, could reduce the market's confidence in our financial statements and harm our stock price. Any inability to provide reliable financial reports or prevent fraud could harm our business.

We may be unable to effectively implement, or effectively implement in a timely manner, the necessary controls and employee training to ensure continued compliance with the Sarbanes-Oxley Act and other regulatory and reporting requirements. Our growth will challenge our ability to maintain the internal control and disclosure standards applicable to public companies. If we fail to successfully complete the procedures and certification and attestation requirements of Section 404, or if in the future after we cease to qualify as an emerging growth company our chief executive officer, chief financial officer or independent registered public accounting firm determines that our internal control over financial reporting is not effective as defined under Section 404, we could be subject to sanctions or investigations by the Securities and Exchange Commission, or SEC, or by other regulatory authorities. Investor perceptions of our company may suffer, likely causing a decline in our stock's market price. We may not be able to fully comply with the requirements of the Sarbanes-Oxley Act or that management or our independent registered public accounting firm will conclude that our internal controls are effective in future periods. Irrespective of compliance with Section 404, any failure of our internal controls could have a material adverse effect on our stated operating results and harm our reputation.

In the course of preparing our consolidated financial statements in prior years, we, in conjunction with our independent registered public accounting firm, identified errors which, combined with other identified control deficiencies, were considered to indicate a material weakness in our internal control over financial reporting related to the accounting and financial statement disclosure over complex accounting matters. The identified errors included an error related to the cash flow statement presentation of lease incentives in our consolidated interim financial statements for the nine months ended September 30, 2015. Also, in 2016, we identified that we inadvertently did not reflect the correction of the identified error related to the cash flow statement presentation of lease incentive in our consolidated interim financial statements for the nine months ended September 30, 2015 on the statement of cash flows included in our quarterly report on Form 10-Q filed with the SEC on November 7, 2016.

A material weakness is a deficiency, or combination of control deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the annual or interim consolidated financial statements will not be prevented or detected on a timely basis. We have taken steps to remediate the material weakness, including increasing the depth and experience within our accounting and finance organization, as well as designing and implementing improved processes and internal controls. This material weakness was remediated as of December 31, 2018. However, our remediation of this material weakness may prove not to be effective in future periods or prevent other material weaknesses or significant deficiencies in our internal control over financial reporting to arise in the future.

We are currently subject to securities class-action litigation and may be subject to similar or other litigation in the future, all of which will require significant management time and attention, result in significant legal expenses and may result in unfavorable outcomes, which may have a material adverse effect on our business, operating results and financial condition, and negatively affect the price of our common stock.

We are, and may in the future become, subject to various legal proceedings and claims that arise in or outside the ordinary course of business. For example, we currently have securities class-action complaints pending against us, our chief executive officer, chief operations officer and former chief financial officer, asserting that we made false or misleading statements in our financial statements, press releases and conference calls during the applicable class periods. The complaints each seek monetary damages, costs and expenses. For more information, see Note 6 of our condensed consolidated financial statements included elsewhere in this report.

We cannot predict the outcome of these proceedings or provide an estimate of damages, if any. We believe that the claims in the securities class actions are without merit and intend to defend against them vigorously. Failure by us to obtain a favorable resolution of the claims set forth in the complaints could have a material adverse effect on our business, results of operations and financial condition. Also, our insurance coverage may be insufficient, and our assets may be insufficient to cover any amounts that exceed our insurance coverage, and we may have to pay damage awards or otherwise may enter into settlement arrangements in connection with such claims. Any such payments or settlement arrangements in current or future litigation could have a material adverse effect on our business, operating results or financial condition. Even if the plaintiffs' claims are not successful, current or future litigation could result in substantial costs and significantly and adversely impact our reputation and divert management's attention and resources, which could have a material adverse effect on our business, operating results and financial condition, and negatively affect the price of our common stock. In addition, such lawsuits may make it more difficult to finance our operations.

Our business could be negatively affected as a result of actions of activist stockholders.

We may be subject to actions or proposals from stockholders that may not align with our business strategies or the interests of our other stockholders. Responding to any such actions could be costly and time-consuming, disrupt our business operations and divert the attention of our board of directors, management and employees from pursuing our business strategies. Likewise, a proxy contest for the election of directors at our annual meeting of stockholders would require us to incur significant legal fees and proxy solicitation expenses and require significant time and attention by our board of directors and management.

In addition, activist stockholders may create perceived uncertainties as to the future direction of our business. These perceived uncertainties may be exploited by our competitors and may result in the loss of potential business opportunities or create the perception of instability, which may make it more difficult to attract and retain qualified personnel and may affect our relationships with our customers, vendors, channel partners, investors or other third parties. Any such perceived uncertainties as to our future direction could also affect the market price and volatility of our stock.

If we fail to retain finance personnel or fail to maintain our financial reporting systems and infrastructure, we may be unable to timely and accurately report our financial results or comply with the requirements of being a public company, including compliance with the Sarbanes-Oxley Act and SEC reporting requirements, which in turn could significantly harm our reputation and our business.

We have hired personnel with financial reporting and Sarbanes-Oxley Act compliance expertise. Our inability to retain these personnel could adversely impact our ability to timely and accurately prepare our financial statements. Further, our inability to retain employees with the requisite experience could adversely affect our financial statements because new employees require time and training to learn our business and operating procedures. If our finance and accounting organization is unable for any reason to meet the increased demands of being a public company then the quality and timeliness of our financial reporting may suffer, which could result in material weaknesses in our internal controls. The consequences of inaccuracies or delays in our reported financial statements could cause the trading price of our common stock to decline and could harm our business, operating results and financial condition.

We may need to raise additional capital which may not be available on favorable terms, if at all, causing dilution to stockholders, restricting our operations or adversely affecting our ability to operate our business.

In the course of running our business we may need to raise capital, diluting our stockholders. If our need is due to unforeseen circumstances or material expenditures or if our operating results are worse than expected then we cannot be certain that we will be able to obtain additional financing on favorable terms, if at all, and these additional financings could cause additional dilution to our stockholders. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions such as incurring additional debt, expending capital, or declaring dividends, or which impose financial covenants on us that limit our ability to achieve our business objectives. If we need but cannot raise additional capital on acceptable terms then we may not be able to meet our business objectives, our stock price may fall, and you may lose some or all of your investment.

Our debt obligations contain restrictions that impact our business and expose us to risks that could adversely affect our liquidity and financial condition.

We have a loan and security agreement, or senior credit facility, with Silicon Valley Bank. As amended in March and August 2018 and April 2019, the senior credit facility provides for (1) a \$25.0 million revolving credit facility, with a \$5.0 million letter of credit sub-facility and (2) a \$23.5 million term loan. At September 30, 2019, we had \$23.5 million of term loan and equipment advance borrowings outstanding, excluding \$0.1 million of unamortized debt issuance costs, and no revolver borrowings outstanding.

Our senior credit facility contains customary covenants, which limit our and our subsidiaries' ability to, among other things:

- incur additional indebtedness or guarantee indebtedness of others;
- create liens on our assets;
- enter into mergers or consolidations;
- dispose of assets;
- pay dividends and make other distributions on our capital stock, and redeem and repurchase our capital stock;
- make investments, including acquisitions; and
- enter into transactions with affiliates.

If our cash in accounts maintained with the lender, plus available revolver borrowings, falls below \$60.0 million for the period of time beginning on March 5, 2018 and ending on December 31, 2018, or \$55.0 million for the period of time beginning on January 1, 2019 and at all times thereafter, we must comply with a covenant to not exceed maximum adjusted EBITDA loss thresholds that vary by period as well as a minimum liquidity ratio, each determined in accordance with the terms of the senior credit facility.

If we experience a decline in cash flow due to any of the factors described in this "Risk Factors" section or otherwise, we could have difficulty paying interest and principal amounts due on our indebtedness and meeting the financial covenants set forth in our senior credit facility. If we are unable to generate sufficient cash flow or otherwise obtain the funds necessary to make required payments under our senior credit facility, or if we fail to comply with the requirements of our indebtedness, we could default under our senior credit facility. Any such default that is not cured or waived could result in the acceleration of the obligations under the senior credit facility, an increase in the applicable interest rate under the senior credit facility, the termination of the revolving commitment, and would permit our lender to exercise remedies with respect to all of the collateral that is securing the senior credit facility, including substantially all of our assets, other than intellectual property. Any such default could have a material adverse effect on our liquidity and financial condition.

Even if we comply with all of the applicable covenants, the restrictions on the conduct of our business could adversely affect our business by, among other things, limiting our ability to take advantage of financings, mergers, acquisitions and other corporate opportunities that may be beneficial to the business.

A breach of our security systems could have a material adverse effect on our business.

We use security systems to maintain our facility's physical security and to protect our proprietary and confidential information, including that of our customers, suppliers and employees. Accidental or willful security breaches or other unauthorized access to our facilities or information systems, or viruses, loggers, or other malware code in our data or software, could compromise access to and the integrity of this information. The consequences of such loss and possible misuse of our proprietary and confidential information could include, among other things, unfavorable publicity, damage to our reputation, difficulty marketing our products, customer allegations of breach-of-contract, litigation by affected parties and possible financial liabilities for damages, any of which could have a material adverse effect on our business, financial condition, reputation and relationships with customers and partners. We also rely on third-party providers of corporate infrastructure services relating to, among other things, human resources, electronic communication services and some financial functions, and we are therefore dependent on the security systems of these providers. Any security breaches or other unauthorized access to our service-providers' systems or viruses, loggers, or other malware code in their data or software could expose us to information loss and misappropriation of confidential information. Because the techniques used to obtain unauthorized access to or sabotage security systems change frequently and are often not recognized until after an attack, we may be unable to anticipate the techniques or implement adequate preventative measures, thereby exposing us to material adverse effect on our business, operations and financial condition.

Our operations could be disrupted by natural disasters.

An earthquake, fire, flood or other natural or manmade disaster could disable our facilities, disrupt operations, or cause catastrophic losses. We have facilities in areas with a known history of seismic activity, such as our headquarters in Seattle, Washington. We also have facilities in areas with a known history of flooding, such as our office in Shanghai, China. We have a wafer testing and dicing subcontractor in Thailand, a region with a known, and quite recent, history of flooding. A loss at or of any of these or other of our or our suppliers' facilities could disrupt operations, delay production and shipments, reduce revenue and engender potentially large expenses to repair or replace the facility. As a specific example, in 2011 and 2012 floods in Thailand disrupted our subcontractor's facility for approximately six months. During that time, we relied on a secondary subcontractor that had longer lead times for, and decreased yield of, our endpoint IC wafers. We do not carry insurance policies that cover potential losses caused by earthquakes, floods or other disasters.

Our ability to use net operating losses to offset future taxable income may be limited.

As of December 31, 2018, we had federal net operating loss carryforwards, or NOLs, of \$159.5 million and federal research and experimentation credit carryforwards of \$10.6 million which we may use to reduce future taxable income or offset income taxes due. We have established a valuation allowance against the carrying value of our deferred tax assets. The tax loss and research and development credit carryforwards begin to expire in 2023. Insufficient future taxable income will adversely affect our ability to utilize these NOLs and credit carryforwards. Reductions in corporate tax rates may reduce the realization of the NOLs. In addition, under Sections 382 and 383 of the U.S. Internal Revenue Code, or the Code, a corporation that experiences a more-than 50% ownership change over a three-year testing period is limited in its ability to use its pre-change NOLs and other tax assets to offset future taxable income or income taxes due. Our existing NOLs and credit carryforwards may be subject to limitations arising from previous ownership changes; if we undergo an ownership change then our ability to use our NOLs and credit carryforwards could be further limited by Sections 382 and 383 of the Code. Future changes in our stock ownership, the causes of which may be outside our control, could result in an ownership change under Sections 382 and 383 of the Code. Our NOLs may also be impaired under state law. As a result of these limitations, we may not be able to utilize a material portion of, or possibly any of, the NOLs and credit carryforwards.

We could be subject to additional income tax liabilities.

We are subject to income taxes in the United States and certain foreign jurisdictions. We use significant judgment in evaluating our worldwide income-tax provision. During the ordinary course of business, we conduct many transactions for which the ultimate tax determination is uncertain. For example, our effective tax rates could be adversely affected by earnings being lower than anticipated in countries where we have lower statutory rates and higher than anticipated in countries where we have higher statutory rates, by changes in currency exchange rates, by changes in the valuation of our deferred tax assets and liabilities or by changes in the relevant tax, accounting and other laws, regulations, principles and interpretations. We are subject to audit in various jurisdictions, and such jurisdictions may assess additional income tax against us. Although we believe our tax estimates are reasonable, the final determination of tax audits and any related litigation could be materially different from our historical income-tax provisions and accruals. The results of an audit or litigation could have a material effect on our operating results or cash flows in the period or periods for which that determination is made.

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

We do not collect sales and use, value-added or similar taxes in all jurisdictions in which we have sales, based on our belief that such taxes are either not applicable or an exemption from such taxes applies. Sales and use, value-added and similar tax laws and rates vary greatly by jurisdiction. Certain jurisdictions in which we do not collect such taxes may assert that such taxes are applicable, which could result in tax assessments, penalties and interest, and we may be required to collect such taxes in the future, including as a result of a change in law. Such tax assessments, penalties and interest or future requirements may adversely affect our operating results.

Risks Relating to the Ownership of Our Common Stock

The market price of our common stock has been and will likely continue to be volatile, and the value of your investment could decline significantly.

There was no public market for our common stock prior to our initial public offering. Since July 2016, when we sold shares of our common stock in our initial public offering at a price of \$14.00 per share, through September 30, 2019, our stock price has ranged from \$9.95 to \$60.85. Securities of companies similar to ours experience significant price and volume fluctuations. The following factors, in addition to other risks described in this report, may have a significant effect on our common stock price:

- price and volume fluctuations in the overall stock market from time to time;
- changes in operating performance, stock market valuations, and volatility in the market prices of other technology companies generally, or those in our industry in particular;
- actual or anticipated quarterly variations in our results of operations or those of our competitors;
- actual or anticipated changes in our growth rate relative to our competitors;
- delays in end-user deployments of RAIN systems;
- announcements by us or our competitors of acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- supply interruptions;
- developments with respect to intellectual property rights;
- our ability to develop and market new and enhanced products on a timely basis;
- commencement of, or our involvement in, litigation;
- changes in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- unstable regional political and economic conditions, such as those caused by the U.S. presidential election and the U.K. referendum to leave the EU;
- the trading volume of our stock;
- limited public float;
- any future sales of our common stock or other securities;
- failure of financial analysts to maintain coverage of us, changes in financial estimates by any analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- fluctuations in the values of companies perceived by investors to be comparable to us;
- the financial projections we may provide to the public, any changes in these projections or our failure to meet these projections; and
- general economic conditions and slow or negative growth of related markets.

In addition, 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 our stock price, regardless of our actual operating performance. In addition, securities class-action litigation has often been instituted against companies whose stock prices have declined, especially following periods of volatility in the overall market, as it has been against us. That litigation has already resulted in substantial costs and a diversion of our management's attention and resources, and those costs and diversion could escalate significantly. For further information regarding this risk, please refer to Note 6 of our consolidated financial statements included elsewhere in this report.

If securities or industry analysts do not publish research reports about our business, or if they issue an adverse opinion about our business, 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 one or more of the analysts who cover us issues an adverse opinion about our company, our stock price would likely decline. If one or more of these analysts ceases coverage of us or fails to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Future sales of our common stock in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our common stock into the public market, particularly sales by our directors, executive officers, and principal stockholders, or the perception that these sales might occur, could cause the market price of our common stock to decline. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

In addition, in the future, we may issue additional shares of common stock or other equity or debt securities convertible into common stock in connection with a financing, acquisition, litigation settlement, employee arrangement or otherwise. Any such issuance could result in substantial dilution to our existing stockholders and could cause our stock price to decline.

Our principal stockholders and management own a significant percentage of our stock and are able to exercise significant influence over matters subject to stockholder approval.

As of September 30, 2019, our executive officers, directors and principal stockholders, together with their respective affiliates, beneficially owned approximately 28.0% of our capital stock. As a result, our executive officers, directors and principal stockholders, if acting together, may be able to significantly influence, in their capacity as stockholders, matters requiring approval by our stockholders, including the election of directors and the approval of mergers, acquisitions or other extraordinary transactions. They may also have interests that differ from yours and may vote in a way with which you disagree and which may be adverse to your interests. This concentration of ownership could have the effect of delaying or preventing a change in our control or otherwise discouraging a potential acquirer from attempting to obtain control of us, which in turn could have a material adverse effect on our stock price and may prevent attempts by our stockholders to replace or remove our board of directors or management.

Anti-takeover provisions in our charter documents and under Delaware or Washington law could make an acquisition of us difficult, limit attempts by our stockholders to replace or remove our current management and limit our stock price.

Provisions of our certificate of incorporation and bylaws may delay or discourage transactions involving an actual or potential change in our control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares, or transactions that our stockholders might otherwise deem to be in their best interests. Therefore, these provisions could adversely affect the price of our stock. Among other things, our certificate of incorporation and bylaws:

- permit our board of directors to issue up to 5,000,000 shares of preferred stock, with any rights, preferences and privileges as they may designate;
- provide that the authorized number of directors may be changed only by resolution of the board of directors;
- provide that all vacancies, including newly created directorships, may, except as otherwise required by law, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- divide our board of directors into three classes;
- restrict the forum for certain litigation against us to Delaware;
- require that any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and may not be taken by written consent;
- provide that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide notice in writing in a timely manner, and also specify requirements as to the form and content of a stockholder's notice;
- do not provide for cumulative voting rights (therefore allowing the holders of a plurality of the shares of common stock entitled to vote in any election of directors to elect all of the directors standing for election, if they should so choose);
- provide that special meetings of our stockholders may be called only by the chair of the board, our chief executive officer or by the board of directors; and
- provide that stockholders will be permitted to amend our bylaws only upon receiving at least two-thirds of the total votes entitled to be cast by holders of all outstanding shares then entitled to vote generally in the election of directors, voting together as a single class.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which generally prohibits a Delaware corporation from engaging in any of a broad range of business combinations with any “interested” stockholder for a period of three years following the date on which the stockholder became an “interested” stockholder. Likewise, because our principal executive offices are located in Washington, the anti-takeover provisions of the Washington Business Corporation Act may apply to us under certain circumstances now or in the future. These provisions prohibit a “target corporation” from engaging in any of a broad range of business combinations with any stockholder constituting an “acquiring person” for a period of five years following the date on which the stockholder became an “acquiring person.”

Our bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our bylaws provide that, unless we otherwise consent in writing, the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty, any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our certificate of incorporation or our bylaws or any action asserting a claim against us that is governed by the internal affairs doctrine. The choice of forum provision may limit stockholders’ ability to bring a claim in a judicial forum favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

As an emerging growth company within the meaning of the Securities Act, we will utilize certain modified disclosure requirements, and we cannot be certain if these reduced requirements will make our common stock less attractive to investors.

We are an emerging growth company, and for as long as we continue to be an emerging growth company, we may choose to take advantage of exemptions from various reporting requirements applicable to other public companies but not to “emerging growth companies” including:

- not being required to have our independent registered public accounting firm audit our internal control over financial reporting under Section 404 of the Sarbanes-Oxley Act;
- reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We plan in filings with the SEC to continue to utilize the modified disclosure requirements available to emerging growth companies. As a result, our stockholders may not have access to certain information they may deem important.

We could remain an “emerging growth company” until the earliest of:

- December 31, 2021;
- the last day of the first fiscal year in which our annual gross revenue exceeds \$1 billion;
- the date that we become a “large accelerated filer” as defined in Rule 12b-2 under the Exchange Act, which would occur if the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the last business day of our most recently completed second fiscal quarter; or
- the date on which we have issued more than \$1 billion in non-convertible debt during the preceding three-year period.

We have incurred and will continue to incur costs by being a public company.

As a public company, we have and will incur significant legal, accounting and other expenses, including costs associated with public-company reporting requirements. We have and will incur costs associated with recently adopted corporate governance requirements, including requirements of the SEC and The Nasdaq Global Select Market. We expect these rules and regulations to lead to ongoing legal and financial compliance costs and to make some activities incrementally more time consuming and costly. We also expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, we may have more difficulty attracting and retaining qualified individuals to serve on our board of directors or as executive officers. We are currently evaluating and monitoring developments with respect to these rules, and we cannot predict or estimate the additional costs we may incur or the timing of such costs.

So long as we remain an “emerging growth company,” we expect to avail ourselves of the exemption from the requirement that our independent registered public accounting firm attest to the effectiveness of our internal control over financial reporting under Section 404. When our independent registered public accounting firm is required to undertake an assessment of our internal control over financial reporting, the cost of our compliance with Section 404 will correspondingly increase. Moreover, if we are not able to comply with the requirements of Section 404 applicable to us in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources.

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

Not applicable.

Item 6. Exhibits

Exhibit Number	Exhibit Description	Form	Incorporation by Reference Date	Number	Filed Herewith
31.1	Certification of Principal Executive Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended				X
31.2	Certification of Principal Financial Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended				X
32.1*	Certification of Principal Executive Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350				X
32.2*	Certification of Principal Financial Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350				X
101.INS	XBRL Instance Document				X
101.SCH	XBRL Taxonomy Extension Schema Linkbase Document				X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				X

* The certifications attached as Exhibits 32.1 and 32.2 that accompany this Quarterly Report on Form 10-Q are not deemed filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of Impinj, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-Q, irrespective of any general incorporation language contained in such filing.

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.

Date: November 4, 2019

Impinj, Inc.

By: /s/ Eric Brodersen

Eric Brodersen

*President and Chief Operating Officer (principal financial officer
and duly authorized signatory)*

CERTIFICATIONS

I, Chris Diorio, Ph.D., certify that:

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

Date: November 4, 2019

/s/ Chris Diorio

Chris Diorio, Ph.D.

Chief Executive Officer

(Principal Executive Officer)

CERTIFICATIONS

I, Eric Brodersen, certify that:

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

Date: November 4, 2019

/s/ Eric Brodersen

Eric Brodersen

President and Chief Operating Officer

(Principal Financial Officer)

IMPINJ, INC.
CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report of Impinj, Inc. (the “Company”) on Form 10-Q for the quarter ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Chris Diorio, Ph.D., Chief Executive Officer (*Principal Executive Officer*) of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Chris Diorio

Chris Diorio, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

November 4, 2019

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Report to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Impinj, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.

IMPINJ, INC.
CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report of Impinj, Inc. (the “Company”) on Form 10-Q for the quarter ended September 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Eric Brodersen, President and Chief Operating Officer (*Principal Financial Officer*) of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Eric Brodersen

Eric Brodersen

President and Chief Operating Officer

(Principal Financial Officer)

November 4, 2019

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Report to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Impinj, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.