UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 31, 2022

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

For the transition period from to

Commission File Number 001-38267

RIBBON COMMUNICATIONS INC.

(Exact name of Registrant as specified in its charter)

Delaware	**82-1669692**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

6500 Chase Oaks Boulevard, Suite 100, Plano, Texas 75023
(Address of principal executive offices) (Zip code)

(978) 614-8100
(Registrant's telephone number, including area code)

N/A
(Former name, former address and former fiscal year, if changed since last report)

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

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock, par value $0.0001	RBBN	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 x No o

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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) o

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

As of May 6, 2022, there were 150,139,066 shares of the registrant's common stock, $0.0001 par value per share, outstanding.

RIBBON COMMUNICATIONS INC.
FORM 10-Q
QUARTERLY PERIOD ENDED MARCH 31, 2022
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Cautionary Note Regarding Forward-Looking Statements

This Quarterly Report on Form 10-Q contains "forward-looking statements" within the meaning of the U.S. Private Securities Litigation Reform Act of 1995, which are subject to a number of risks and uncertainties. All statements other than statements of historical facts contained in this Quarterly Report on Form 10-Q, including statements regarding our future expenses, results of operations and financial position, integration activities, expected impacts from the war in Ukraine and the financial sanctions imposed in connection therewith, expected impacts of the ongoing COVID-19 pandemic, beliefs about our business strategy, availability of components for the manufacturing of our products, expected benefits from our acquisition of ECI Telecom Group Ltd. ("ECI") and the sale of our Kandy Communications business ("Kandy"), plans and objectives of management for future operations, plans for future cost reductions, if any, restructuring activities, and plans for future product offerings, development and manufacturing are forward-looking statements. Without limiting the foregoing, the words "anticipates", "believes", "could", "estimates", "expects", "intends", "may", "plans", "seeks" and other similar language, whether in the negative or affirmative, are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are unknown and/or difficult to predict and that may cause our actual results, performance or achievements to be materially different from those expressed or implied by the forward-looking statements. Such risks and uncertainties include, but are not limited to, supply chain disruptions resulting from component availability and/or geopolitical instabilities and disputes (including those related to the war in Ukraine); risks related to the ongoing COVID-19 pandemic on the global economy and financial markets as well as us, our customers and suppliers, which may impact our sales, gross margin, customer demand and our ability to supply our products to our customers; failure to realize anticipated benefits of our acquisition of ECI; declines in the value of our ongoing investment in American Virtual Cloud Technologies, Inc. ("AVCT"), the purchaser of Kandy; unpredictable fluctuations in quarterly revenue and operating results; risks related to cybersecurity and data intrusion; failure to compete successfully against telecommunications equipment and networking companies; failure to grow our customer base or generate recurring business from our existing customers; credit risks; the timing of customer purchasing decisions and our recognition of revenues; macroeconomic conditions; the impact of restructuring and cost-containment activities; litigation; market acceptance of our products and services; rapid technological and market change; our ability to protect our intellectual property rights and obtain necessary licenses; our ability to maintain partner, reseller, distribution and vendor support and supply relationships; the potential for defects in our products; risks related to the terms of our credit agreement; higher risks in international operations and markets; increases in tariffs, trade restrictions or taxes on our products; currency fluctuations; and/or failure or circumvention of our controls and procedures. We therefore caution you against relying on any of these forward-looking statements.

Additional important factors that could cause actual results to differ materially from those in these forward-looking statements are also discussed in Part I, Item 2, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and Part I, Item 1A and Part II, Item 7A, "Risk Factors" and "Quantitative and Qualitative Disclosures About Market Risk," respectively, of our Annual Report on Form 10-K for the year ended December 31, 2021. Any forward-looking statement made by us in this Quarterly Report on Form 10-Q speaks only as of the date on which this Quarterly Report on Form 10-Q was first filed. We undertake no obligation to publicly update any forward-looking statement, whether as a result of new information, future developments or otherwise.

PART I FINANCIAL INFORMATION

Item 1. Financial Statements

RIBBON COMMUNICATIONS INC.
Condensed Consolidated Balance Sheets
(in thousands, except share and per share data)
(unaudited)

	March 31, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 92,838	$ 103,915
Restricted cash	2,627	2,570
Accounts receivable, net	220,964	282,917
Inventory	61,578	54,043
Other current assets	44,723	37,545
Total current assets	422,730	480,990
Property and equipment, net	48,043	47,685
Intangible assets, net	335,188	350,730
Goodwill	300,892	300,892
Investments	16,904	43,931
Deferred income taxes	53,843	47,287
Operating lease right-of-use assets	49,549	53,147
Other assets	37,006	23,075
	$ 1,264,155	$ 1,347,737
Liabilities and Stockholders' Equity		
Current liabilities:		
Current portion of term debt	$ 20,058	$ 20,058
Accounts payable	97,837	97,121
Accrued expenses and other	94,584	100,752
Operating lease liabilities	16,622	17,403
Deferred revenue	109,084	109,119
Total current liabilities	338,185	344,453
Long-term debt, net of current	330,353	350,217
Operating lease liabilities, net of current	51,599	55,196
Deferred revenue, net of current	19,312	20,619
Deferred income taxes	8,104	8,116
Other long-term liabilities	42,190	41,970
Total liabilities	789,743	820,571
Commitments and contingencies (Note 17)		
Stockholders' equity:		
Preferred stock, $0.01 par value per share; 10,000,000 shares authorized, none issued and outstanding	—	—
Common stock, $0.0001 par value per share; 240,000,000 shares authorized; 150,111,958 shares issued and outstanding at March 31, 2022; 148,895,308 shares issued and outstanding at December 31, 2021	15	15
Additional paid-in capital	1,877,677	1,875,234
Accumulated deficit	(1,425,636)	(1,355,661)
Accumulated other comprehensive income	22,356	7,578
Total stockholders' equity	474,412	527,166
	$ 1,264,155	$ 1,347,737

See notes to the unaudited condensed consolidated financial statements.

RIBBON COMMUNICATIONS INC.
Condensed Consolidated Statements of Operations
(in thousands, except per share data)
(unaudited)

	Three months ended	
	March 31, 2022	March 31, 2021
Revenue:		
Product	$ 81,990	$ 97,889
Service	91,208	94,883
Total revenue	173,198	192,772
Cost of revenue:		
Product	51,209	44,445
Service	35,667	37,780
Amortization of acquired technology	8,267	10,061
Total cost of revenue	95,143	92,286
Gross profit	78,055	100,486
Operating expenses:		
Research and development	52,690	47,410
Sales and marketing	37,619	37,218
General and administrative	12,862	15,553
Amortization of acquired intangible assets	7,275	5,762
Acquisition-, disposal- and integration-related	1,849	1,197
Restructuring and related	4,814	5,950
Total operating expenses	117,109	113,090
Loss from operations	(39,054)	(12,604)
Interest expense, net	(4,001)	(5,819)
Other expense, net	(28,800)	(25,448)
Loss before income taxes	(71,855)	(43,871)
Income tax benefit (provision)	1,880	(816)
Net loss	$ (69,975)	$ (44,687)
Loss per share:		
Basic	$ (0.47)	$ (0.31)
Diluted	$ (0.47)	$ (0.31)
Weighted average shares used to compute loss per share:		
Basic	149,167	145,936
Diluted	149,167	145,936

See notes to the unaudited condensed consolidated financial statements.

RIBBON COMMUNICATIONS INC.
Condensed Consolidated Statements of Comprehensive Loss
(in thousands)
(unaudited)

	Three months ended	
	March 31, 2022	March 31, 2021
Net loss	$ (69,975)	$ (44,687)
Other comprehensive income (loss), net of tax:		
Unrealized gain on interest rate swap	15,469	6,669
Foreign currency translation adjustments	(691)	47
Other comprehensive income, net of tax	14,778	6,716
Comprehensive loss, net of tax	$ (55,197)	$ (37,971)

See notes to the unaudited condensed consolidated financial statements.

RIBBON COMMUNICATIONS INC.
Condensed Consolidated Statements of Stockholders' Equity
(in thousands, except shares)
(unaudited)

Three months ended March 31, 2022

	Common stock					
	Shares	Amount	Additional paid-in capital	Accumulated deficit	Accumulated other comprehensive income	Total stockholders' equity
Balance at January 1, 2022	148,895,308	$ 15	$ 1,875,234	$ (1,355,661)	$ 7,578	$ 527,166
Exercise of stock options	355					—
Vesting of restricted stock units	1,610,990					—
Vesting of performance-based stock units	175,751					—
Shares of restricted stock returned to the Company under net share settlements to satisfy tax withholding obligations	(570,446)		(1,812)			(1,812)
Stock-based compensation expense			4,255			4,255
Other comprehensive income					14,778	14,778
Net loss				(69,975)		(69,975)
Balance at March 31, 2022	150,111,958	$ 15	$ 1,877,677	$ (1,425,636)	$ 22,356	$ 474,412

Three months ended March 31, 2021

	Common stock					
	Shares	Amount	Additional paid-in capital	Accumulated deficit	Accumulated other comprehensive (loss) income	Total stockholders' equity
Balance at January 1, 2021	145,425,248	$ 15	$ 1,870,256	$ (1,178,476)	$ (4,942)	$ 686,853
Exercise of stock options	13,389		24			24
Vesting of restricted stock awards and units	1,662,628					—
Vesting of performance-based stock units	1,525,681					—
Shares of restricted stock returned to the Company under net share settlements to satisfy tax withholding obligations	(1,268,356)		(11,233)			(11,233)
Stock-based compensation expense			5,060			5,060
Other comprehensive income					6,716	6,716
Net loss				(44,687)		(44,687)
Balance at March 31, 2021	147,358,590	$ 15	$ 1,864,107	$ (1,223,163)	$ 1,774	$ 642,733

See notes to the unaudited condensed consolidated financial statements.

RIBBON COMMUNICATIONS INC.
Condensed Consolidated Statements of Cash Flows
(in thousands)
(unaudited)

	Three months ended	
	March 31, 2022	March 31, 2021
Cash flows from operating activities:		
Net loss	$ (69,975)	$ (44,687)
Adjustments to reconcile net loss to cash flows provided by (used in) operating activities:		
Depreciation and amortization of property and equipment	3,885	4,226
Amortization of intangible assets	15,542	15,823
Amortization of debt issuance costs	527	3,141
Stock-based compensation	4,255	5,060
Deferred income taxes	(6,773)	293
Decrease in fair value of investments	27,027	22,441
Foreign currency exchange losses	1,105	1,716
Changes in operating assets and liabilities:		
Accounts receivable	60,461	28,083
Inventory	(11,837)	(330)
Other operating assets	(423)	979
Accounts payable	540	(3,800)
Accrued expenses and other long-term liabilities	(7,962)	(41,480)
Deferred revenue	(1,342)	2,323
Net cash provided by (used in) operating activities	15,030	(6,212)
Cash flows from investing activities:		
Purchases of property and equipment	(3,471)	(5,357)
Net cash used in investing activities	(3,471)	(5,357)
Cash flows from financing activities:		
Proceeds from issuance of term debt	—	74,625
Principal payments of term debt	(20,015)	(77,132)
Principal payments of finance leases	(198)	(272)
Payment of debt issuance costs	(370)	(789)
Proceeds from the exercise of stock options	—	24
Payment of tax withholding obligations related to net share settlements of restricted stock awards	(1,812)	(11,233)
Net cash used in financing activities	(22,395)	(14,777)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(184)	(464)
Net decrease in cash, cash equivalents and restricted cash	(11,020)	(26,810)
Cash, cash equivalents and restricted cash, beginning of year	106,485	135,697
Cash, cash equivalents and restricted cash, end of period	$ 95,465	$ 108,887
Supplemental disclosure of cash flow information:		
Interest paid	$ 3,453	$ 4,317
Income taxes paid	$ 2,576	$ 7,656
Income tax refunds received	$ 12	$ 766
Supplemental disclosure of non-cash investing activities:		
Capital expenditures incurred, but not yet paid	$ 2,420	$ 3,059
Supplemental disclosure of non-cash financing activities:		
Total fair value of restricted stock awards, restricted stock units and performance-based stock units on date vested	$ 5,533	$ 28,182

See notes to the unaudited condensed consolidated financial statements.

(1) BASIS OF PRESENTATION

Business

Ribbon Communications Inc. ("Ribbon" or the "Company") is a leading global provider of communications technology to service providers and enterprises. The Company provides a broad range of software and high-performance hardware products, network solutions and services that enable the secure delivery of data and voice communications, and high-bandwidth networking and connectivity for residential consumer and for small, medium and large enterprises, and industry verticals such as finance, education, government, utilities and transportation. Ribbon's mission is to create a recognized global technology leader providing cloud-centric solutions that enable the secure exchange of information, with unparalleled scale, performance and elasticity. The Company is headquartered in Plano, Texas, and has a global presence with research and development or sales and support locations in over thirty-five countries around the world.

Basis of Presentation

In the opinion of management, the accompanying unaudited condensed consolidated financial statements include all adjustments, consisting only of normal recurring items, necessary for their fair presentation with accounting principles generally accepted in the United States of America ("GAAP") and with the rules and regulations of the U.S. Securities and Exchange Commission ("SEC").

Interim results are not necessarily indicative of results for a full year or any future interim period. The information included in this Quarterly Report on Form 10-Q should be read in conjunction with the Company's Annual Report on Form 10-K for the year ended December 31, 2021 (the "Annual Report"), which was filed with the SEC on March 11, 2022.

Operating Segments

The Company's chief operating decision maker (the "CODM") is its President and Chief Executive Officer. The CODM assesses the Company's performance based on the performance of two separate organizations within Ribbon: the Cloud and Edge segment ("Cloud and Edge") and the IP Optical Networks segment ("IP Optical Networks").

Reclassifications

In the fourth quarter of 2021, the Company reclassified amounts recorded for amortization of certain acquired intangible assets in prior presentations from Total operating expenses under the caption "Amortization of acquired intangible assets" to Cost of revenue under the caption "Amortization of acquired technology" in the condensed consolidated statements of operations. The Company's management believes this presentation aids in the comparability of its financial statements to industry peers. This reclassification did not impact the condensed consolidated balance sheets or statements of cash flows for any historical periods. The Company reports depreciation of property and equipment related to production activities as components of Cost of revenue. This reclassification for the three months ended March 31, 2021 was as follows (in thousands):

	Three months ended March 31, 2021		
	Prior presentation	Amounts reclassified	Revised presentation
Product revenue	$ 97,889		$ 97,889
Service revenue	94,883		94,883
Total revenue	192,772	—	192,772
Cost of revenue - product	44,445		44,445
Cost of revenue - service	37,780		37,780
Amortization of acquired technology	—	10,061	10,061
Total cost of revenue	82,225	10,061	92,286
Total gross profit	110,547	(10,061)	100,486
Research and development	47,410		47,410
Sales and marketing	37,218		37,218
General and administrative	15,553		15,553
Amortization of acquired intangible assets	15,823	(10,061)	5,762
Acquisition-, disposal- and integration-related	1,197		1,197
Restructuring and related	5,950		5,950
Total operating expenses	123,151	(10,061)	113,090
Loss from operations	$ (12,604)	$ —	$ (12,604)

Significant Accounting Policies

The Company's significant accounting policies are disclosed in Note 2 to the Consolidated Financial Statements included in the Annual Report. There were no material changes to the significant accounting policies during the three months ended March 31, 2022.

Principles of Consolidation

The condensed consolidated financial statements include the accounts of Ribbon and its wholly-owned subsidiaries. Intercompany transactions and balances have been eliminated in consolidation.

Use of Estimates and Judgments

The preparation of financial statements in conformity with GAAP requires Ribbon to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting periods. Significant estimates and judgments relied upon in preparing these condensed consolidated financial statements include accounting for business combinations, revenue recognition for multiple element arrangements, inventory valuations, assumptions used to determine the fair value of stock-based compensation, intangible asset and goodwill valuations, including impairments, legal contingencies and recoverability of Ribbon's net deferred tax assets and the related valuation allowances. Ribbon regularly assesses these estimates and records changes in estimates in the period in which they become known. Ribbon bases its estimates on historical experience and various other assumptions that it believes to be reasonable under the circumstances. Actual results could differ from those estimates.

Restricted Cash

The Company classifies as restricted cash all cash pledged as collateral to secure long-term obligations and all cash whose use is otherwise limited by contractual provisions.

At both March 31, 2022 and December 31, 2021, the Company had $2.6 million of restricted cash, representing restricted short-term bank deposits pledged to secure certain performance and financial bonds as security for the Company's obligations under tenders, contracts and to one of its main subcontractors.

Transfers of Financial Assets

The Company maintains customer receivables factoring agreements with a number of financial institutions, primarily for IP Optical Networks sales outside of the United States. Under the terms of these agreements, the Company may transfer receivables to the financial institutions, on a non-recourse basis, provided that the financial institutions approve the receivables in advance. The Company maintains credit insurance policies from major insurance providers or obtains letters of credit from the customers for a majority of its factored trade receivables. The Company accounts for the factoring of its financial assets as a sale of the assets and records the factoring fees, when incurred, as a component of interest expense in the condensed consolidated statements of operations, and the proceeds from the sales of receivables are included in cash from operating activities in the condensed consolidated statements of cash flows. During the three months ended March 31, 2022, the Company received $18.0 million of cash from the sale of certain accounts receivable and recorded $0.2 million of interest expense in connection with these transactions. During the three months ended March 31, 2021, the Company received $31.3 million of cash from the sale of certain accounts receivable and recorded $0.2 million of interest expense in connection with these transactions.

Going Concern Assessment and Management Plans

The accompanying condensed consolidated financial statements are prepared in accordance with GAAP applicable to a going concern, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business.

Under the 2020 Credit Facility (as defined in Note 9), the Company is required to maintain compliance with certain financial covenants (see Note 9). As of March 31, 2022, the Company was in compliance with its financial covenants. Due to the impact of market conditions on its forecast, including supply chain disruptions, higher costs, and other geopolitical instabilities and disputes, the Company projects it may not maintain compliance with its financial covenants under the 2020 Credit Facility, as amended, for the quarters ended June 30, 2022 and September 30, 2022. Failure to remain in compliance would be an event of default that would permit the Lenders (as defined in Note 9) to accelerate the maturity of the 2020 Credit Facility. As of the date of the issuance of these condensed consolidated financial statements, the Company currently does not have sufficient cash on hand or available liquidity to repay the outstanding balance of $355.5 million as of March 31, 2022, in the event the debt is accelerated.

Management's plans to avoid any potential event of default include raising additional cash that would allow the Company to pay down debt in order to remain in compliance with its financial covenants. The Company has or is in the process of obtaining agreements with certain vendors and with certain lending institutions that allow the Company to factor additional trade receivables. In addition, the Company has to ability to sell its derivative financial instrument and its investment in equity securities, which had an aggregate fair market value of $34 million as of March 31, 2022. Lastly, the Company would evaluate the timing of its capital spending and extension of its payment terms with vendors as needed.

In addition to the above plans, the Company has entered into discussions with its Lenders to seek a further amendment to the 2020 Credit Facility to adjust the covenants, and believes the likelihood of completion is reasonably likely. However, an amendment has not been finalized and is not within the Company's control.

The Company believes its plans are probable of being successfully implemented, which will result in adequate cash to allow the Company to pay down debt to meet its financial covenant requirements.

Recent Accounting Pronouncements

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers* ("ASU 2021-08"), which amends ASC 805, *Business Combinations (Topic 805)*, to add contract assets and contract liabilities to the list of exceptions to the recognition and measurement principles that apply to business combinations and to require that an acquiring entity recognize and measure contract assets and contract liabilities acquired in a business combination in accordance with ASC 606, *Revenue from Contracts with Customers (Topic 606)* ("ASC 606"). Under current GAAP, an acquirer generally recognizes such items at fair value on the acquisition date. While primarily related to contract assets and contract liabilities that were accounted for by the acquiree in accordance with ASC 606, ASU 2021-08 also applies to contract assets and contract liabilities from other contracts to which the provisions of ASC 606 apply, such as contract liabilities from the sale of nonfinancial assets within the scope of ASU 2017-05, *Other Income - Gains and Losses from the Derecognition of Nonfinancial Assets (Subtopic 610-20)*. ASU 2021-08 is effective for the Company January 1, 2023, with early adoption permitted. The Company believes that the adoption of ASU 2021-08 could have a material impact on its consolidated financial statements for periods including and subsequent to significant business acquisitions.

In January 2021 the FASB issued ASU 2021-01, *Reference Rate Reform (Topic 848): Scope* ("ASU 2021-01"), which refines the scope of ASC 848, *Reference Rate Reform*, and clarifies some of its guidance as part of the FASB's monitoring of global reference rate reform activities. ASU 2021-01 permits entities to elect certain optional expedients and exceptions when accounting for derivative contracts and certain hedging relationships affected by changes in the interest rates used for discounting cash flows, for computing variation margin settlements, and for calculating price alignment interest in connection with reference rate reform activities under way in global financial markets (the "discounting transition"). ASU 2021-01 is effective for the Company prospectively in any period through December 31, 2022 that a modification is made to the terms of the derivatives affected by the discounting transition. The adoption of ASU 2021-01 did not have a material impact on the Company's consolidated financial statements.

(2) EARNINGS (LOSS) PER SHARE

Basic earnings (loss) per share is computed by dividing net income (loss) by the weighted average number of shares outstanding during the period. For periods in which the Company reports net income, diluted net earnings per share is determined by using the weighted average number of common and dilutive common equivalent shares outstanding during the period, unless the effect is antidilutive.

The calculations of shares used to compute loss per share were as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Weighted average shares outstanding - basic	149,167	145,936
Potential dilutive common shares	—	—
Weighted average shares outstanding - diluted	149,167	145,936

Options to purchase the Company's common stock and unvested restricted and performance-based stock units aggregating 8.4 million shares and 12.8 million shares have not been included in the computation of diluted earnings per share for the three months ended March 31, 2022 and 2021, respectively, because their effect would have been antidilutive.

(3) INVENTORY

Inventory at March 31, 2022 and December 31, 2021 consisted of the following (in thousands):

	March 31, 2022	December 31, 2021
On-hand final assemblies and finished goods inventories	$ 68,107	$ 57,360
Deferred cost of goods sold	1,944	1,474
	70,051	58,834
Less noncurrent portion (included in other assets)	(8,473)	(4,791)
Current portion	$ 61,578	$ 54,043

(4) INTANGIBLE ASSETS AND GOODWILL

The Company's intangible assets at March 31, 2022 and December 31, 2021 consisted of the following (in thousands):

March 31, 2022	Weighted average amortization period (years)	Cost	Accumulated amortization	Net carrying value
In-process research and development	*	$ 34,000	$ —	$ 34,000
Developed technology	7.93	306,380	189,660	116,720
Customer relationships	11.86	268,140	84,651	183,489
Trade names	3.88	5,000	4,021	979
Internal use software	3.00	730	730	—
	9.17	$ 614,250	$ 279,062	$ 335,188

December 31, 2021	Weighted average amortization period (years)	Cost	Accumulated amortization	Net carrying value
In-process research and development	*	$ 34,000	$ —	$ 34,000
Developed technology	7.93	306,380	181,393	124,987
Customer relationships	11.86	268,140	77,653	190,487
Trade names	3.88	5,000	3,744	1,256
Internal use software	3.00	730	730	—
	9.17	$ 614,250	$ 263,520	$ 350,730

* An in-process research and development intangible asset has an indefinite life until the product is generally available, at which time such asset is typically reclassified to developed technology.

Estimated future amortization expense for the Company's intangible assets at March 31, 2022 was as follows (in thousands):

Years ending December 31,	
Remainder of 2022	$ 44,907
2023	53,966
2024	46,899
2025	40,338
2026	36,489
2027	31,634
Thereafter	80,955
	$ 335,188

There were no changes to the carrying value of the Company's goodwill in the three months ended March 31, 2022 or

2021. The components of goodwill at March 31, 2022 and March 31, 2021 were as follows (in thousands):

	Cloud and Edge	IP Optical Networks	Total
Balance at March 31, 2022			
Goodwill	$ 392,302	$ 191,996	$ 584,298
Accumulated impairment losses	(167,406)	(116,000)	(283,406)
	$ 224,896	$ 75,996	$ 300,892
Balance at March 31, 2021			
Goodwill	$ 392,302	$ 191,996	$ 584,298
Accumulated impairment losses	(167,406)	—	(167,406)
	$ 224,896	$ 191,996	$ 416,892

(5) INVESTMENTS AND FAIR VALUE HIERARCHY

The Company received debentures and warrants as sale consideration in connection with the sale of its Kandy Communications Business on December 1, 2020 to American Virtual Cloud Technologies, Inc. ("AVCT"). The debentures bore interest at a rate of 10% per annum (the "Debentures"), which was added to the principal amount of the Debentures. The Company recorded $1.5 million of interest income in the three months ended March 31, 2021, which was added to the principal amount of the Debentures, and which is included in Interest expense, net, in the condensed consolidated statement of operations. On September 8, 2021 (the "Debenture Conversion Date"), the debentures were converted into 13,700,421 shares of AVCT common stock (the "Debenture Shares"). The warrants entitle the Company to purchase 4,377,800 shares of AVCT common stock at an exercise price of $0.01 per share, and expire on December 1, 2025 (the "Warrants"). The Company had not exercised any of the Warrants as of March 31, 2022. The Company's investment in AVCT (the "AVCT Investment") is comprised of the debentures and Warrants for periods prior to the Debenture Conversion Date and the Debenture Shares and Warrants for periods subsequent to the Debenture Conversion Date. The Company is recording the AVCT Investment at fair value, with changes in fair value recorded as a component of Other expense, net, in the condensed consolidated statements of operations.

The fair values of the AVCT Investment, which are reported as Investments in the Company's condensed consolidated balance sheets, were $16.9 million and $43.9 million at March 31, 2022 and December 31, 2021, respectively. The Company recorded a loss of $27.0 million in the three months ended March 31, 2022, representing the change in the fair value of the AVCT Investment. The Company recorded a loss of $23.9 million in the three months ended March 31, 2021 representing the change in the fair value of the AVCT Investment, which was partially offset by the paid-in-kind interest income described above. The AVCT Investment is classified as a Level 1 fair value measurement at both March 31, 2022 and December 31, 2021.

The Company evaluated the nature of its investment in AVCT at March 31, 2022 and December 31, 2021, and determined that it represented an equity interest on a diluted basis of approximately 10% and 15%, respectively. The Company determined that it is not the primary beneficiary of AVCT as it does not have the power to direct the activities that most significantly impact the AVCT Investment's economic performance, and therefore concluded that it had neither significant influence nor a controlling interest arising from the AVCT Investment that would require consolidation as of March 31, 2022 or December 31, 2021.

The carrying amounts of the Company's financial instruments approximate their fair values and include cash equivalents, accounts receivable, borrowings under a revolving credit facility, accounts payable and long-term debt.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or a liability. The three-tier fair value hierarchy is based on the level of independent, objective evidence surrounding the inputs used to measure fair value. A financial instrument's categorization within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The fair value hierarchy is as follows:

Level 1. Level 1 applies to assets or liabilities for which there are quoted prices in active markets for identical assets or liabilities.

Level 2. Level 2 applies to assets or liabilities for which there are inputs that are directly or indirectly observable in the marketplace, such as quoted prices for similar assets or liabilities in active markets or quoted prices for identical assets or liabilities in markets with insufficient volume or infrequent transactions (less active markets).

Level 3. Level 3 applies to assets or liabilities for which there are unobservable inputs to the valuation methodology that are significant to the measurement of the fair value of the assets or liabilities.

(6) ACCRUED EXPENSES AND OTHER

Accrued expenses at March 31, 2022 and December 31, 2021 consisted of the following (in thousands):

	March 31, 2022	December 31, 2021
Employee compensation and related costs	$ 33,317	$ 38,040
Professional fees	17,451	14,365
Other	43,816	48,347
	$ 94,584	$ 100,752

(7) WARRANTY ACCRUALS

The changes in the Company's accrual balance in the three months ended March 31, 2022 were as follows (in thousands):

Balance at January 1, 2022	$ 13,120
Current period provisions	1,525
Settlements	(1,393)
Balance at March 31, 2022	$ 13,252

(8) RESTRUCTURING AND FACILITIES CONSOLIDATION INITIATIVES

The Company recorded restructuring and related expense aggregating $4.8 million and $6.0 million in the three months ended March 31, 2022 and 2021, respectively. Restructuring and related expense includes restructuring expense (primarily severance and related costs), estimated future variable lease costs for vacated properties with no intent or ability of sublease, and accelerated rent amortization expense.

For restructuring events that involve lease assets and liabilities, the Company applies lease reassessment and modification guidance and evaluates the right-of-use assets for potential impairment. If the Company plans to exit all or distinct portions of a facility and does not have the ability or intent to sublease, the Company will accelerate the amortization of each of those lease components through the vacate date. The accelerated amortization is recorded as a component of Restructuring and related expense in the Company's condensed consolidated statements of operations. Related variable lease expenses will continue to be expensed as incurred through the vacate date, at which time the Company will reassess the liability balance to ensure it appropriately reflects the remaining liability associated with the premises and records a liability for the estimated future variable lease costs.

Restructuring and related expense for the three months ended March 31, 2022 and 2021 was comprised of the following (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Severance and related costs	$ 4,122	$ 669
Variable and other facilities-related costs	692	1,913
Accelerated amortization of lease assets due to cease-use	—	3,368
	$ 4,814	$ 5,950

Accelerated Rent Amortization

Accelerated rent amortization of lease assets is recognized from the date that the Company commences the plan to fully or partially vacate a facility, for which there is no intent or ability to enter into a sublease, through the final vacate date. The liability for the total lease payments for each respective facility is included as a component of Operating lease liabilities in the Company's condensed consolidated balance sheets, both current and noncurrent (see Note 15). The Company may incur additional future expense if it is unable to sublease other locations included in its restructuring initiatives.

2022 Restructuring Plan

On February 14, 2022, the Company's Board of Directors approved a strategic restructuring program (the "2022 Restructuring Plan") to streamline the Company's operations in order to support the Company's investment in critical growth areas. The 2022 Restructuring Plan is expected to include, among other things, charges related to a consolidation of facilities and a workforce reduction. Any positions eliminated in countries outside the United States are subject to local law and consultation requirements.

The Company recorded restructuring and related expense of $4.2 million for severance and related costs for approximately 50 employees in connection with the 2022 Restructuring Plan in the three months ended March 31, 2022. A summary of the 2022 Restructuring Plan accrual activity for the three months ended March 31, 2022 is as follows (in thousands):

	Balance at January 1, 2022	Initiatives charged to expense	Cash payments	Balance at March 31, 2022
Severance	$ —	$ 4,179	$ (365)	$ 3,814

2020 and 2019 Restructuring Plans

In 2020, the Company implemented a restructuring plan to eliminate certain positions and redundant facilities, primarily in connection with the Company's acquisition of ECI Telecom Group Ltd. in 2020 (the "ECI Acquisition"), to streamline the Company's global footprint and improve its operations (the "2020 Restructuring Plan"). The 2020 Restructuring Plan included facility consolidations and a reduction in workforce to eliminate functions arising from the ECI Acquisition and support its efforts to integrate the two companies. At March 31, 2022, the 2020 Restructuring Plan had a remaining accrual of $0.8 million for severance costs that are expected to be paid out over the next year.

In June 2019, the Company implemented a restructuring plan to streamline the Company's global footprint, improve its operations and enhance its customer delivery (the "2019 Restructuring Plan"). The 2019 Restructuring Plan included facility consolidates, refinement of the Company's research and development activities, and a reduction in workforce. At March 31, 2022, the 2019 Restructuring Plan had a remaining accrual of $1.4 million for facility costs that remain in the plan and which will be paid out over the various lease terms, which range from one to six years.

Balance Sheet Classification

The current portions of accrued restructuring are included as a component of Accrued expenses and the long-term portions of accrued restructuring are included as a component of Other long-term liabilities in the condensed consolidated balance sheets. The long-term portions of accrued restructuring relate to facilities and totaled $1.4 million at March 31, 2022 and $1.6 million at December 31, 2021.

(9) DEBT

2020 Credit Facility

On March 3, 2020, the Company entered into a Senior Secured Credit Facilities Credit Agreement (as amended, the "2020 Credit Facility"), by and among the Company, as a guarantor, Ribbon Communications Operating Company, Inc., as the borrower ("Borrower"), Citizens Bank, N.A. ("Citizens"), as administrative agent, a lender, issuing lender, swingline lender, joint lead arranger and bookrunner, Santander Bank, N.A., as a lender, joint lead arranger and bookrunner, and the other lenders party thereto (each, together with Citizens Bank, N.A. and Santander Bank, N.A., referred to individually as a "Lender", and collectively, the "Lenders"). The proceeds of the 2020 Credit Facility were used, in part, to pay off in full all obligations of the Company under its prior credit facility.

The 2020 Credit Facility provides for $500 million of commitments from the Lenders to the Borrower, comprised of $400 million in term loans (the "2020 Term Loan Facility") and a $100 million facility available for revolving loans (the "2020 Revolving Credit Facility"). Under the 2020 Revolving Credit Facility, a $30 million sublimit is available for letters of credit and a $20 million sublimit is available for swingline loans. Under the 2020 Credit Facility, the Company was originally required to make quarterly principal payments aggregating approximately $10 million in the first year, $20 million per year for the following three years, and $30 million in the last year, with the remaining balance due on the maturity date. The 2020 Credit Facility also requires periodic interest payments until maturity.

The indebtedness and other obligations under the 2020 Credit Facility are unconditionally guaranteed on a senior secured basis by the Company, Edgewater Networks, Inc., a wholly-owned subsidiary of the Company, and GENBAND Inc., a wholly-owned subsidiary of the Company (together, the "Guarantors"). The facilities under the 2020 Credit Facility are secured by first-priority liens on substantially all of the assets of the Borrower and the Guarantors, including substantially all of the assets of the Company.

The 2020 Credit Facility requires compliance with certain financial covenants, including a minimum Consolidated Fixed Charge Coverage Ratio and a maximum Consolidated Net Leverage Ratio (each as defined in the 2020 Credit Facility, and each tested on a quarterly basis).

In addition, the 2020 Credit Facility contains various covenants that, among other restrictions, limit the Company's and its subsidiaries' ability to incur or assume indebtedness; grant or assume liens; make acquisitions or engage in mergers; sell, transfer, assign or convey assets; repurchase equity and make dividend and certain other restricted payments; make investments; engage in transactions with affiliates; enter into sale and leaseback transactions; enter into burdensome agreements; change the nature of its business; modify their organizational documents; and amend or make prepayments on certain junior debt.

The 2020 Credit Facility contains events of default that are customary for a secured credit facility. If an event of default relating to bankruptcy or other insolvency events with respect to the Company or any of its subsidiaries occurs, all obligations under the 2020 Credit Facility will immediately become due and payable. If any other event of default occurs under the 2020 Credit Facility, the lenders may accelerate the maturity of the obligations outstanding under the Credit Facility and exercise other rights and remedies, including charging a default rate of interest equal to 2.00% per year above the rate that would otherwise be applicable. In addition, if any event of default exists under the 2020 Credit Facility, the lenders can commence foreclosure or other actions against the collateral.

On August 18, 2020 (the "First Amendment Date"), the Borrower entered into a First Amendment to the 2020 Credit Facility (the "First Amendment"). Pursuant to an assignment and assumption agreement entered into by Citizens and certain affiliates of Whitehorse Capital on the First Amendment Date (collectively, "HIG Whitehorse"), and consented to by Citizens and the Borrower, $75 million of the 2020 Term Loan Facility, designated as the Term B Loan (the "Term B Loan"), was assigned from Citizens to HIG Whitehorse as of August 18, 2020. The remaining $325 million of the 2020 Term Loan Facility that was not assigned to HIG Whitehorse was deemed the Term A Loan (the "Term A Loan" and, together with the Term B Loan, the "Amended 2020 Term Loan Facility").

The Term A Loan and the 2020 Revolving Credit Facility mature in March 2025. The Term A Loan and 2020 Revolving Credit Facility bear interest at the Borrower's option at either the LIBOR rate plus a margin ranging from 1.50% to 3.50% per year, or the base rate (the highest of the Federal Funds Effective Rate (as defined in the 2020 Credit Facility) plus 0.50%, or the prime rate announced from time to time in The Wall Street Journal) plus a margin ranging from 0.50% to 2.50% per year (the "Applicable Margin"). The Applicable Margin varies depending on the Company's Consolidated Net Leverage Ratio (as defined in the 2020 Credit Facility). The base rate and the LIBOR rate are each subject to a zero percent floor. The Company was required to make quarterly principal payments on the Term A Loan aggregating approximately $10 million in the first year, $16 million per year in each of the next two years, $20 million in the fourth year and $16 million in the last year, with the final payment approximating $244 million due on the maturity date. The Borrower could prepay all amounts under the Term A Loan and the 2020 Revolving Credit Facility at any time without premium or penalty (other than customary LIBOR breakage costs), subject to certain notice requirements.

The Term B Loan was scheduled to mature in March 2026 and bore interest, at the Borrower's option, at either the LIBOR rate plus a margin of 7.50% per year, or the base rate (the highest of the Federal Funds Effective Rate (as defined in the First Amendment) plus 0.50%, or the prime rate announced from time to time in The Wall Street Journal, plus a margin of 6.50% per year. The Term B Loan had a lower rate of amortization than the Term A Loan and was subject to a 1.0% premium if voluntarily repaid in connection with a repricing transaction (as defined in the 2020 Credit Facility) occurring prior to the six-month anniversary of the First Amendment Effective Date. The Company was required to make quarterly principal payments totaling approximately $1 million in the first year and $8 million in the aggregate over the next four and a half years, with the final payment approximating $66 million.

The First Amendment reduced the Borrower's ability to incur new tranches of term loans, or increases in commitments under the Amended 2020 Term Loan Facility or the 2020 Revolving Credit Facility. Specifically, such indebtedness could be incurred up to an aggregate dollar amount equal to 75% of the Company's Consolidated Adjusted EBITDA (as defined in the 2020 Credit Facility), reduced from 100% prior to the First Amendment, as of the most recently ended fiscal quarter for which financial statements had been delivered to the lenders, plus additional amounts, so long as the Borrower's Consolidated Net Leverage Ratio (as defined in the 2020 Credit Agreement) did not exceed 2.25:1.00, reduced from 2.75:1.00 under the 2020 Credit Facility. The First Amendment also reduced the amount of Unrestricted Cash (as defined in the 2020 Credit Facility) used in calculating the Borrower's Consolidated Net Leverage Ratio from $25 million to $10 million.

On December 1, 2020, the Borrowers entered into a Second Amendment to the 2020 Credit Facility to obtain consent for an equity exchange with AVCT in connection with the Kandy Sale, as well as to amend certain other provisions of the 2020 Credit Facility.

On March 3, 2021 (the "Third Amendment Date"), the Company, the Borrower and certain of its subsidiaries entered into a Third Amendment to Credit Agreement (the "Third Amendment"), which further amended the 2020 Credit Facility. The Third Amendment provided for an incremental term loan facility to the Borrower in the original principal amount of $74.6 million, the proceeds of which were used on the Third Amendment Date to consummate an open market purchase of all outstanding amounts under the Term B Loan. Upon the consummation of the open market purchase, the Term B Loans were assigned to the Borrower and immediately cancelled, such that the outstanding amount under the Term A Loan and incremental term loan facility were combined and held by the Lenders (the "2020 Term Loan") with the same terms as the Term A Loan. The Company wrote off $2.5 million of capitalized debt issuance costs in connection with the Third Amendment, which is included in Interest expense, net, in the Company's condensed consolidated statement of operations for the three months ended March 31, 2021. The Company was required to make quarterly principal payments on the 2020 Term Loan aggregating approximately $20 million per year in the first three years and $30 million in the fourth year, with the final payment approximating $300 million due on the maturity date.

The Third Amendment increased the Borrower's ability to incur new incremental revolving commitments or term loans. Such indebtedness can be incurred up to an aggregate dollar limit equal to 100% of the Company's Consolidated Adjusted EBITDA (as defined in the 2020 Credit Facility) as of the most recently ended fiscal quarter for which financial statements have been delivered to the Lenders, plus additional amounts, so long as the Borrower's Consolidated Net Leverage Ratio (as defined in the Credit Agreement) does not exceed 2.75:1.00, increased from 2.25:1.00 under the First Amendment. The Third Amendment also increased the amount of Unrestricted Cash (as defined in the 2020 Credit Facility) used in calculating the Borrower's Consolidated Net Leverage Ratio from $10.0 million to $25.0 million.

On March 10, 2022, the Borrowers entered into a Fourth Amendment to the 2020 Credit Facility (the "Fourth Amendment") to increase the Maximum Consolidated Net Leverage Ratio (as defined in the 2020 Credit Facility) to 4.25:1.00 for the first quarter of 2022 and 4.50:1.00 for the second quarter of 2022, with reductions in subsequent quarters through the third quarter of 2023, when the ratio will be fixed at 3.00:1.00. In connection with the Fourth Amendment, the Company made a $15.0 million prepayment that was applied to the final payment due on the maturity date. Subsequent to the Fourth Amendment, the Company is required to make quarterly principal payments on the 2020 Term Loan aggregating approximately $20 million per year for the next two years and $30 million in the following year, with the final payment approximating $285 million due on the maturity date.

At March 31, 2022, the Company had an outstanding 2020 Term Loan balance of $355.5 million at an average interest rate of 3.4% and $4.4 million of letters of credit outstanding with an interest rate of 2.5%. At December 31, 2021, the Company had an outstanding 2020 Term Loan balance of $375.5 million at an average interest rate of 3.4% and $4.3 million of letters of credit outstanding with an interest rate of 2.5%. The Company was in compliance with all covenants of the 2020 Credit Facility at both March 31, 2022 and December 31, 2021.

Letters of Credit and Performance and Bid Bonds

The Company uses letters of credit and performance and bid bonds in the course of its business. At March 31, 2022, the Company had letters of credit, bank guarantees, and performance and bid bonds outstanding (collectively, "Guarantees") aggregating $30.7 million, comprised of the $4.4 million of letters of credit under the 2020 Credit Facility described above (the "Letters of Credit") and $26.3 million of bank guarantees and performance and bid bonds (collectively, the "Other Guarantees") under various uncommitted facilities. At December 31, 2021, the Company had Guarantees aggregating $30.1 million, comprised of the $4.3 million of Letters of Credit noted above and $25.8 million of Other Guarantees. At both March 31, 2022 and December 31, 2021, the Company had cash collateral of $2.6 million, supporting the Guarantees, which is reported as Restricted cash in the condensed consolidated balance sheets.

(10) DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES

The Company is exposed to financial market risk related to foreign currency fluctuations and changes in interest rates. These exposures are actively monitored by management. To manage the volatility related to the exposure to changes in interest rates, the Company has entered into a derivative financial instrument. Management's objective is to reduce, where it is deemed appropriate to do so, fluctuations in earnings and cash flows associated with changes in interest rates. Ribbon's policies and practices are to use derivative financial instruments only to the extent necessary to manage exposures. Ribbon does not hold or issue derivative financial instruments for trading or speculative purposes.

The Company records derivatives on the balance sheet at fair value. The accounting for changes in the fair value of derivatives depends on the intended use of the derivative, whether the Company has elected to designate a derivative in a hedging relationship and apply hedge accounting and whether the hedging relationship has satisfied the criteria necessary to apply hedge accounting. Derivatives designated and qualifying as a hedge of the exposure to changes in the fair value of an asset, liability, or firm commitment attributable to a specific risk, such as interest rate risk, are considered fair value hedges. Derivatives designated and qualifying as a hedge of the exposure to variability in expected future cash flows, or other types of forecasted transactions, are considered cash flow hedges. Derivatives may also be designated as hedges of the foreign currency exposure of a net investment in a foreign operation. Hedge accounting generally provides for the matching of the timing of gain or loss recognition on the hedging instrument with the recognition of the changes in the fair value of the hedged asset or liability that are attributable to the hedged risk in a fair value hedge, or the earnings effect of the hedged forecasted transactions in a cash flow hedge. The Company may enter into derivative contracts that are intended to economically hedge certain of its risk even though hedge accounting does not apply or the Company elects not to apply hedge accounting.

Cash Flow Hedge of Interest Rate Risk

The 2020 Term Loan Facility had outstanding balances of $355.5 million and $375.5 million at March 31, 2022 and December 31, 2021, respectively. The 2020 Revolving Credit Facility was undrawn at both March 31, 2022 and December 31, 2021. Borrowings under the 2020 Credit Facility have variable interest rates based on LIBOR (see Note 9). As a result of exposure to interest rate movements, during March 2020, the Company entered into an interest rate swap arrangement, which effectively converted its $400 million term loan with its variable interest rate based upon one-month LIBOR to an aggregate fixed rate of 0.904%, plus a leverage-based margin as defined in the 2020 Credit Facility. The notional amount of this swap at March 31, 2022 was $400 million, and the swap matures on March 3, 2025, the same date the 2020 Credit Facility matures.

The Company's objectives in using interest rate derivatives are to add stability to interest expense and to manage its exposure to interest rate movements. To accomplish this objective, the Company is using an interest rate swap as part of its interest rate risk management strategy. Interest rate swaps designated as cash flow hedges involve the receipt of variable amounts from a counterparty in exchange for the Company making fixed-rate payments over the life of the agreements without exchange of the underlying notional amount.

The effective portion of changes in the fair value of designated derivatives that qualify as cash flow hedges is recorded in accumulated other comprehensive income in the condensed consolidated balance sheet and is subsequently reclassified into earnings in the period that the hedged forecasted transactions affect earnings. During the three months ended March 31, 2022 and 2021, such a derivative was used to hedge the variable cash flows associated with the outstanding borrowings under the 2020 Credit Facility and the Company has accounted for this derivative as an effective hedge. Any ineffective portion of the change in the fair value of the derivative would be recognized directly in earnings.

Amounts reported in accumulated other comprehensive income related to the Company's derivative are reclassified to interest expense as interest is accrued on the Company's variable-rate debt. Based upon projected forward rates, the Company estimates as of March 31, 2022 that $2.7 million may be reclassified as a decrease to interest expense over the next twelve months.

The impact of the Company's derivative financial instrument on its condensed consolidated statements of comprehensive loss for the three months ended March 31, 2022 and 2021 was as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Gain recognized in other comprehensive income (loss) on derivative (effective portion)	$ 14,713	$ 5,889
Amount reclassified from accumulated other comprehensive income to interest expense (effective portion)	756	780
	$ 15,469	$ 6,669

The fair values and locations in the condensed consolidated balance sheets at March 31, 2022 and December 31, 2021 of the Company's derivative assets (liabilities) designated as a hedging instrument were as follows (in thousands):

	Balance sheet location	March 31, 2022	December 31, 2021
Interest rate derivative - asset derivative	Other current assets	$ 2,695	$ —
Interest rate derivative - asset derivative	Other assets	14,585	3,865
Interest rate derivative - liability derivative	Accrued expenses and other	—	(2,054)
		$ 17,280	$ 1,811

The Company has classified the interest rate derivative aggregating $17.3 million and $1.8 million at March 31, 2022 and December 31, 2021, respectively, as Level 2 fair value measurements within the fair value hierarchy (see Note 5).

(11) REVENUE RECOGNITION

The Company derives revenue from two primary sources: products and services. Product revenue includes the Company's hardware and software that function together to deliver the products' essential functionality. Software and hardware are also sold on a standalone basis. Services include customer support (software updates, upgrades and technical support), consulting, design services, installation services and training. Generally, contracts with customers contain multiple performance obligations, consisting of products and services. For these contracts, the Company accounts for individual performance obligations separately if they are considered distinct.

When an arrangement contains more than one performance obligation, the Company will allocate the transaction price to each performance obligation on a relative standalone selling price basis. The Company utilizes the observable price of goods and services when they are sold separately to similar customers in order to estimate standalone selling price.

The Company's software licenses typically provide a perpetual right to use the Company's software. The Company also sells term-based software licenses that expire and Software-as-a-Service ("SaaS")-based software which are referred to as subscription arrangements. The Company does not customize its software nor are installation services required, as the customer has a right to utilize internal resources or a third-party service company. The software and hardware are delivered before related services are provided and are functional without professional services or customer support. The Company has concluded that its software licenses are functional intellectual property that are distinct, as the user can benefit from the software on its own. Product revenue is typically recognized upon transfer of control or when the software is made available for download, as this is the point the user of the software can direct the use of, and obtain substantially all of the remaining benefits from, the functional intellectual property. The Company begins to recognize software revenue related to the renewal of subscription software licenses at the start of the subscription period.

The Company offers warranties on its products. Certain of the Company's warranties are considered to be assurance-type in nature, ensuring the product is functioning as intended. Assurance-type warranties do not represent separate performance obligations. The Company also sells separately-priced maintenance service contracts which qualify as service-type warranties and represent separate performance obligations. The Company does not allow and has no history of accepting product returns.

Services revenue includes revenue from customer support and other professional services. Customer support includes software updates on a when-and-if-available basis, telephone support, integrated web-based support and bug fixes or patches. The Company sells its customer support contracts at a percentage of list or net product price. Customer support revenue is recognized ratably over the term of the customer support agreement, which is typically one year.

The Company's professional services include consulting, technical support, resident engineer services, design services and installation services. Because control transfers over time, revenue is recognized based on progress toward completion of the performance obligation. The method to measure progress toward completion requires judgment and is based on the nature of the products or services to be provided. The Company generally uses the input method to measure progress for its contracts because it believes such method best depicts the transfer of assets to the customer, which occurs as the Company incurs costs for the contracts. However, in some instances, the Company uses the output method because it best depicts the transfer of asset to the customer. Under the cost-to-cost measure of progress, the progress toward completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. When the measure of progress is based upon expended labor, progress toward completion is measured as the ratio of labor time expended to date versus the total estimated labor time required to complete the performance obligation. Revenue is recorded proportionally as costs are incurred or as labor is expended. Costs to fulfill these obligations include internal labor as well as subcontractor costs.

Customer training includes courses offered by the Company. The related revenue is typically recognized as the training services are performed.

The Company's typical performance obligations include the following:

Performance Obligation	When Performance Obligation is Typically Satisfied	When Payment is Typically Due
Software and Product Revenue		
Software licenses (perpetual or term)	Upon transfer of control; typically, when made available for download (point in time)	Generally, within 30 days of invoicing except for term licenses, which may be paid for over time
Software licenses (subscription)	Upon activation of hosted site (over time)	Generally, within 30 days of invoicing
Hardware	When control of the hardware passes to the customer; typically, upon delivery (point in time)	Generally, within 30 days of invoicing
Software upgrades	Upon transfer of control; typically, when made available for download (point in time)	Generally, within 30 days of invoicing
Customer Support Revenue		
Customer support	Ratably over the course of the support contract (over time)	Generally, within 30 days of invoicing
Professional Services		
Other professional services (excluding training services)	As work is performed (over time)	Generally, within 30 days of invoicing (upon completion of services)
Training	When the class is taught (point in time)	Generally, within 30 days of services being performed

Significant Judgments

The Company's contracts with customers often include promises to transfer multiple products and services to the customer. Determining whether products and services are considered distinct performance obligations that should be accounted for separately versus together may require significant judgment.

Judgment is required to determine the standalone selling price ("SSP") for each distinct performance obligation. The Company typically has more than one SSP for individual products and services due to the stratification of those products and services by customers and circumstances. In these instances, the Company may use information such as the size of the customer and geographic region in determining the SSP.

Deferred Revenue

Deferred revenue is a contract liability representing amounts collected from or invoiced to customers in excess of revenue recognized. This results primarily from the billing of annual customer support agreements where the revenue is recognized over the term of the agreement. The value of deferred revenue will increase or decrease based on the timing of recognition of revenue.

Disaggregation of Revenue

The Company disaggregates its revenue from contracts with customers based on the nature of the products and services and the geographic regions in which each customer is domiciled. The Company's revenue for the three months ended March 31, 2022 and 2021 was disaggregated as follows:

Three months ended March 31, 2022	Product revenue	Service revenue (maintenance)	Service revenue (professional services)	Total revenue
United States	$ 31,940	$ 33,064	$ 10,645	$ 75,649
Europe, Middle East and Africa	24,410	17,742	6,811	48,963
Asia Pacific	22,390	10,425	3,447	36,262
Other	3,250	7,374	1,700	12,324
	$ 81,990	$ 68,605	$ 22,603	$ 173,198

Three months ended March 31, 2021	Product revenue	Service revenue (maintenance)	Service revenue (professional services)	Total revenue
United States	$ 36,812	$ 31,606	$ 11,162	$ 79,580
Europe, Middle East and Africa	28,208	19,655	6,910	54,773
Asia Pacific	25,582	9,748	5,803	41,133
Other	7,287	7,696	2,303	17,286
	$ 97,889	$ 68,705	$ 26,178	$ 192,772

The Company's product revenue from indirect sales through its channel partner program and from its direct sales program for the three months ended March 31, 2022 and 2021 was as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Indirect sales through channel partner program	$ 23,500	$ 20,163
Direct sales	58,490	77,726
	$ 81,990	$ 97,889

The Company's product revenue from sales to enterprise customers and from sales to service provider customers for the three months ended March 31, 2022 and 2021 was as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Sales to enterprise customers	$ 22,083	$ 22,668
Sales to service provider customers	59,907	75,221
	$ 81,990	$ 97,889

The Company's product revenue and service revenue components by segment for the three months ended March 31, 2022 and 2021 were as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Product revenue:		
Cloud and Edge	$ 37,635	$ 50,152
IP Optical Networks	44,355	47,737
Total product revenue	$ 81,990	$ 97,889
Service revenue:		
Maintenance:		
Cloud and Edge	$ 55,030	$ 54,673
IP Optical Networks	13,575	14,032
Total maintenance revenue	68,605	68,705
Professional services:		
Cloud and Edge	17,141	20,597
IP Optical Networks	5,462	5,581
Total professional services revenue	22,603	26,178
Total service revenue	$ 91,208	$ 94,883

Revenue Contract Balances

The timing of revenue recognition, billings and cash collections results in billed accounts receivable; unbilled receivables, which are contract assets; and customer advances and deposits, which are contract liabilities, in the Company's condensed consolidated balance sheets. Amounts are billed as work progresses in accordance with agreed-upon contractual terms, either at periodic intervals or upon achievement of contractual milestones. Completion of services and billing may occur subsequent to revenue recognition, resulting in contract assets. The Company may receive advances or deposits from its customers before revenue is recognized, resulting in contract liabilities that are classified as deferred revenue. These assets and liabilities are reported in the Company's condensed consolidated balance sheets on a contract-by-contract basis as of the end of each reporting period. Changes in the contract asset and liability balances during the three months ended March 31, 2022 were not materially impacted by any factors other than billing and revenue recognition. Nearly all of the Company's deferred revenue balance is related to services revenue, primarily customer support contracts. Unbilled receivables stem primarily from engagements where services have been performed; however, billing cannot occur until services are completed.

In some arrangements, the Company allows customers to pay for term-based software licenses and products over the term of the software license. The Company also sells SaaS-based software under subscription arrangements, with payment terms over the term of the SaaS agreement. Amounts recognized as revenue in excess of amounts billed are recorded as unbilled receivables. Unbilled receivables that are anticipated to be invoiced in the next twelve months are included in Accounts receivable on the Company's condensed consolidated balance sheets. The changes in the Company's accounts receivable, unbilled receivables and deferred revenue balances for the three months ended March 31, 2022 were as follows (in thousands):

	Accounts receivable	Unbilled accounts receivable	Deferred revenue (current)	Deferred revenue (long-term)
Balance at January 1, 2022	$ 208,972	$ 73,945	$ 109,119	$ 20,619
Increase (decrease), net	(67,879)	5,926	(35)	(1,307)
Balance at March 31, 2022	$ 141,093	$ 79,871	$ 109,084	$ 19,312

The Company recognized approximately $45 million of revenue in the three months ended March 31, 2022 that was recorded as deferred revenue at December 31, 2021 and approximately $42 million of revenue in the three months ended March 31, 2021 that was recorded as deferred revenue at December 31, 2020. Of the Company's deferred revenue reported as long-term in its condensed consolidated balance sheet at March 31, 2022, the Company expects that approximately $10 million will be recognized as revenue in 2023, approximately $6 million will be recognized as revenue in 2024 and approximately $3 million will be recognized as revenue in 2025 and beyond.

All freight-related customer invoicing is recorded as revenue, while the shipping and handling costs that occur after control of the promised goods or services transfer to the customer are reported as fulfillment costs, a component of Cost of revenue - product in the Company's condensed consolidated statements of operations.

Deferred Commissions Cost

Sales commissions earned by the Company's employees are considered incremental and recoverable costs of obtaining a contract with a customer. Expense related to commission payments has been deferred on our condensed consolidated balance sheet and is being amortized over the expected life of the customer contract, which averages five years. The current and long-term portions of deferred commission expense are included as components of Other current assets and Other assets, respectively. At both March 31, 2022 and December 31, 2021, the Company had $3.8 million of deferred sales commissions capitalized.

(12) OPERATING SEGMENT INFORMATION

The Company has two reportable segments, which are intended to align with the manner in which the business is managed: Cloud and Edge, and IP Optical Networks.

The Cloud and Edge segment provides secure and reliable software and hardware products, solutions and services for enabling Voice over Internet Protocol ("VoIP") communications, Voice over Long-Term Evolution ("VoLTE") and Voice Over 5G ("VoNR") communications, and Unified Communications and Collaboration ("UC&C") within service provider and enterprise networks and from the cloud. The Cloud and Edge products are increasingly software-centric and cloud-native for deployment on private, public or hybrid cloud infrastructures, in data centers, on enterprise premises and within service provider networks. Ribbon's Cloud and Edge product portfolio consists of its Session Border Controller ("SBC") products and its Network Transformation ("NTR") products.

The IP Optical Networks segment provides high-performance, secure solutions for IP networking and optical transport, supporting wireless networks including 5G, metro and edge aggregation, core networking, data center interconnect, legacy transformation and transport solutions for wholesale carriers. This portfolio is offered to service provider, enterprise and industry verticals with critical transport network infrastructures including utilities, government, defense, transportation, and education and research.

The Company has not provided segment asset information as such information is not provided to the CODM and accordingly, asset information is not used in assessing segment performance. Segment revenue and expenses included in the tables below represent direct revenue and expense attributable to each segment. Please see Note 4 for information regarding the allocation of goodwill between segments.

The CODM utilizes revenue and adjusted gross profit to measure and assess each segment's performance. The Company calculates adjusted gross profit by excluding from cost of revenue: amortization of acquired technology and stock-based compensation, and may also exclude other items in future periods that the Company believes are not part of the Company's core business. Adjusted gross profit is not a financial measure determined in accordance with U.S. GAAP and may not be comparable to similarly titled measures used by other companies, and should not be considered a substitute for gross profit or other results reported in accordance with U.S. GAAP. See below for a reconciliation of adjusted gross profit to gross profit, which is the most directly comparable U.S. GAAP measure.

The tables below provide information regarding revenue, adjusted gross profit, and depreciation expense by reportable segment for the three months ended March 31, 2022 and 2021 (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Segment revenue:		
Cloud and Edge	$ 109,806	$ 125,422
IP Optical Networks	63,392	67,350
Revenue	$ 173,198	$ 192,772

	Three months ended	
	March 31, 2022	March 31, 2021
Segment adjusted gross profit:		
Cloud and Edge	$ 68,293	$ 84,335
IP Optical Networks	18,609	26,474
Total segment adjusted gross profit	86,902	110,809
Stock-based compensation expense	(580)	(262)
Amortization of acquired technology	(8,267)	(10,061)
Gross profit	$ 78,055	$ 100,486

	Three months ended	
	March 31, 2022	March 31, 2021
Segment depreciation expense:		
Cloud and Edge	$ 2,715	$ 3,137
IP Optical Networks	1,170	1,089
Depreciation expense	$ 3,885	$ 4,226

(13) MAJOR CUSTOMERS

The following customer contributed 10% or more of the Company's revenue in the three months ended March 31, 2022 and 2021:

	Three months ended	
	March 31, 2022	March 31, 2021
Verizon Communications Inc.	13%	16%

At March 31, 2022, no customer accounted for 10% or more of the Company's accounts receivable balance. At December 31, 2021, one customer accounted for 10% or more of the Company's accounts receivable balance, representing approximately 15% of total accounts receivable. The Company performs ongoing credit evaluations of its customers and generally does not require collateral on accounts receivable, although in some instances the Company may require letters of credit to support customer outstanding accounts receivable balances. The Company maintains an allowance for doubtful accounts and such losses have been within management's expectations.

(14) STOCK-BASED COMPENSATION PLANS

2019 Stock Incentive Plan

The Company's Amended and Restated 2019 Incentive Award Plan (the "2019 Plan") provides for the award of options to purchase the Company's common stock ("stock options"), stock appreciation rights ("SARs"), restricted stock awards ("RSAs"), performance-based stock awards ("PSAs"), restricted stock units ("RSUs"), performance-based stock units ("PSUs") and other stock- or cash-based awards. Awards can be granted under the 2019 Plan to the Company's employees, officers and non-employee directors, as well as consultants and advisors of the Company and its subsidiaries.

Assumed Stock Plans

In connection with the acquisition of Edgewater Networks, Inc. in August 2018, the Company assumed Edgewater's Amended and Restated 2002 Stock Option Plan (the "Edgewater Plan") to the extent of the shares underlying the options outstanding under the Edgewater Plan as of the Edgewater Acquisition Date (the "Edgewater Options"). The Edgewater Options were converted to Ribbon stock options (the "Ribbon Replacement Options") which are vesting under the same schedules as the respective Edgewater Options.

In connection with the Company's acquisitions of Performance Technologies Inc. ("PT") in 2014, and Network Equipment Technologies, Inc. ("NET") in 2012, the Company assumed their stock plans (collectively, the "Assumed Plans"). Any outstanding awards under the Assumed Plans that in the future expire, terminate, are cancelled or surrendered, or are repurchased by the Company will be returned to the 2019 Plan. Accordingly, no additional shares may be granted under the Assumed Plans.

Executive Equity Arrangements

Inducement Awards

In connection with his appointment as President and Chief Executive Office of Ribbon, and as an inducement for Bruce McClelland's ("Mr. McClelland") commencement of employment, the Company awarded Mr. McClelland sign-on equity grants, comprised of 462,963 RSUs and a PSU grant with both market and service conditions (the "Inducement PSUs") on March 16, 2020. The RSUs vested and were released to Mr. McClelland on March 16, 2021. Subject to Mr. McClelland's continued employment, the Inducement PSUs are eligible to vest and be settled in up to 4,750,000 shares of Ribbon common stock upon the achievement of specified share price thresholds on or prior to September 1, 2024. The first share price threshold for Mr. McClelland’s Inducement PSUs was achieved on February 26, 2021, and accordingly 1,333,333 shares were released to him.

Performance-Based Stock Grants

In addition to granting RSUs to its executives and certain of its employees, the Company also grants PSUs to certain of its executives, including the Inducement PSUs granted to Mr. McClelland as described above.

In 2021, 2020 and 2019, the Company granted certain of its executives (the "2021 PSUs", "2020 PSUs" and "2019 PSUs", respectively), of which 60% of each executive's PSU grant had both performance and service conditions (the "Performance PSUs") and 40% had both market and service conditions (the "Market PSUs"). The 2019 PSUs earned were released on March 15, 2022; these releases are included in the table below.

Each executive's Performance PSU grant is comprised of three consecutive fiscal year performance periods beginning in the year of grant (each, a "Fiscal Year Performance Period"), with one-third of the Performance PSUs attributable to each Fiscal Year Performance Period. The number of shares that will be vest for each Fiscal Year Performance Period, if any, will be based on the achievement of certain metrics related to the Company's financial performance for the applicable year on a standalone basis (each, a "Fiscal Year Performance Condition"). The Company's achievement of the goals for each Fiscal Year Performance Condition (and the number of shares of Company common stock to vest as a result thereof) are being measured on a linear sliding scale in relation to specific threshold, target and stretch performance conditions, with any shares earned vesting in the first quarter of the fiscal year following the third Performance Period of the grant, pending each executive's continued employment with the Company through that date. The number of shares of common stock underlying the Performance PSUs that can be earned will in no event exceed 200% of the Performance PSUs. Shares subject to the Performance PSUs that fail to be earned will be forfeited.

The Market PSUs have one three-year performance period, beginning January 1 in the year of grant and ending on December 31, three years thereafter (the "Market Performance Period"). The number of shares subject to the Market PSUs that will vest, if any, will be dependent upon the Company's total shareholder return ("TSR") compared with the TSR of the companies included in a custom index for the applicable Market Performance Period, measured by the Compensation Committee after the Market Performance Period ends, with any shares earned vesting in the first quarter of the fiscal year following the respective Market Performance Period, pending each executive's continued employment with the Company through that date. The number of shares of common stock underlying the Market PSUs that can be earned will in no event exceed 200% of the Market PSUs. Shares subject to the Market PSUs that fail to be earned will be forfeited.

Accounting for Performance PSUs. Once the grant date criteria have been met for a Fiscal Year Performance Period, the Company records stock-based compensation expense for the respective underlying Performance PSUs based on its assessment of the probability that each performance condition will be achieved and the level, if any, of such achievement. The Compensation Committee determines the number of shares earned, if any, after the Company's financial results for each Fiscal Year Performance Period are finalized. Upon the determination by the Compensation Committee of the number of shares that will be received upon vesting of the Performance PSUs, such number of shares becomes fixed and the unamortized expense is recorded through the remainder of the service period, generally three years from the date of grant, at which time the total Performance PSUs earned, if any, will vest, pending each executive's continued employment with the Company through that date.

Accounting for Market PSUs. PSUs that include a market condition require the use of a Monte Carlo simulation approach to model future stock price movements based upon the risk-free rate of return, the date of return, the volatility of each entity and the pair-wise covariance between each entity. These results are then used to calculate the grant date fair values of the respective PSUs. The Company is required to record expense for the PSUs with market conditions through their respective final vesting dates, regardless of the number of shares that are ultimately earned.

Stock Options

The activity related to the Company's outstanding stock options for the three months ended March 31, 2022 was as follows:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (years)	Aggregate Intrinsic Value (in thousands)
Outstanding at January 1, 2022	184,169	$ 13.25		
Exercised	(355)	$ 1.95		
Expired	(3,470)	$ 15.62		
Outstanding at March 31, 2022	180,344	$ 13.23	2.35	$ 50
Vested or expected to vest at March 31, 2022	180,344	$ 13.23	2.35	$ 50
Exercisable at March 31, 2022	180,344	$ 13.23	2.35	$ 50

Both the total intrinsic value of options exercised and cash received in connection with those exercises was nominal in the three months ended March 31, 2022.

Restricted Stock Units

The activity related to the Company's RSUs for the three months ended March 31, 2022 was as follows:

	Shares	Weighted Average Grant Date Fair Value
Unvested balance at January 1, 2022	5,389,611	$ 6.19
Granted	71,077	$ 4.05
Vested	(1,610,990)	$ 6.40
Forfeited	(138,550)	$ 6.44
Unvested balance at March 31, 2022	3,711,148	$ 6.05

The total grant date fair value of shares of restricted stock underlying RSUs that vested during the three months ended March 31, 2022 was $10.3 million.

Performance-Based Stock Units

The activity related to the Company's PSUs for the three months ended March 31, 2022 was as follows:

	Shares	Weighted Average Grant Date Fair Value
Unvested balance at January 1, 2022	4,987,876	$ 2.87
Granted	18,225	$ 2.65
Vested	(175,751)	$ 5.03
Forfeited	(283,258)	$ 7.95
Unvested balance at March 31, 2022	4,547,092	$ 2.31

The total grant date fair value of shares of restricted stock underlying PSUs that vested during the three months ended March 31, 2022 was $0.9 million.

Stock-Based Compensation

The condensed consolidated statements of operations include stock-based compensation for the three months ended March 31, 2022 and 2021 as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Product cost of revenue	$ 99	$ 27
Service cost of revenue	481	235
Research and development	1,206	627
Sales and marketing	1,371	1,874
General and administrative	1,098	2,297
	$ 4,255	$ 5,060

At March 31, 2022, there was $21.1 million, net of expected forfeitures, of unrecognized stock-based compensation expense related to unvested stock options and stock units. This expense is expected to be recognized over a weighted average period of approximately two years.

(15) LEASES

The Company has operating and finance leases for corporate offices, research and development facilities, and certain equipment. Operating leases are reported separately in the Company's condensed consolidated balance sheets. Assets acquired under finance leases are included in Property and equipment, net, in the condensed consolidated balance sheets.

The Company determines if an arrangement is a lease at inception. A contract is determined to contain a lease component if the arrangement provides the Company with a right to control the use of an identified asset. Lease agreements may include lease and non-lease components. In such instances for all classes of underlying assets, the Company does not separate lease and non-lease components but rather, accounts for the entire arrangement under leasing guidance. Leases with an initial term of 12 months or less are not recorded on the balance sheet and lease expense for these leases is recognized on a straight-line basis over the lease term.

Right-of-use assets and lease liabilities are initially measured based on the present value of the future minimum fixed lease payments (i.e., fixed payments in the lease contract) over the lease term at the commencement date. As the Company's existing leases do not have a readily determinable implicit rate, the Company uses its incremental borrowing rate based on the information available at the commencement date in determining the present value of future minimum fixed lease payments. The Company calculates its incremental borrowing rate to reflect the interest rate that it would have to pay to borrow on a collateralized basis an amount equal to the lease payments in a similar economic environment over a similar term and considers its historical borrowing activities and market data from entities with comparable credit ratings in this determination. The measurement of the right-of-use asset also includes any lease payments made prior to the commencement date (excluding any lease incentives) and initial direct costs incurred. The Company assessed its right-of-use assets for impairment as of March 31, 2022 and December 31, 2021 and determined no impairment has occurred.

Lease terms may include options to extend or terminate the lease and the Company incorporates such options in the lease term when it has the unilateral right to make such an election and it is reasonably certain that the Company will exercise that option. In making this determination, the Company considers its prior renewal and termination history and planned usage of the assets under lease, incorporating expected market conditions.

For operating leases, lease expense for minimum fixed lease payments is recognized on a straight-line basis over the lease term. The expense for finance leases includes both interest and amortization expense components, with the interest component calculated based on the effective interest method and the amortization component calculated based on straight-line amortization of the right-of-use asset over the lease term. Lease contracts may contain variable lease costs, such as common area maintenance, utilities and tax reimbursements that vary over the term of the contract. Variable lease costs are not included in minimum fixed lease payments and as a result, are excluded from the measurement of the right-of-use assets and lease liabilities. The Company expenses all variable lease costs as incurred.

As of March 31, 2022, the Company had not recorded accelerated amortization of lease assets or accrued variable lease costs in connection with the 2022 Restructuring Plan.

In connection with the 2019 Restructuring Plan, certain lease assets related to facilities are being partially or fully vacated as the Company consolidates its facilities. The Company has no plans to enter into sublease agreements for certain facilities. The Company ceased use of these facilities in the first quarter of 2021, the first and fourth quarters of 2020, and the third quarter of 2019. Accordingly, the Company accelerated the amortization of the associated lease assets through the planned cease-use date of each facility, resulting in additional amortization expense of $3.4 million in the three months ended March 31, 2021. The Company also recorded expense of $1.4 million in the three months ended March 31, 2021 for all estimated future variable lease costs related to these facilities. The Company did not record expense for accelerated amortization or estimated future variable lease costs in connection with the 2019 Restructuring Plan in the three months ended March 31, 2022.

All accelerated amortization and accrual of future variable costs are recorded as Restructuring and related expense in the Company's condensed consolidated statements of operations. At March 31, 2022 and December 31, 2021, the Company had accruals of $1.4 million and $1.6 million, respectively, for all future anticipated variable lease costs related to these facilities. The Company may incur additional future expense if it is unable to sublease other locations included in the Facilities Initiative.

The Company leases its corporate offices and other facilities under operating leases, which expire at various times through 2032. The Company's right-of-use lease assets and lease liabilities at March 31, 2022 and December 31, 2021 were as follows (in thousands):

	Classification	March 31, 2022	December 31, 2021
Assets:			
Operating lease assets	Operating lease right-of-use assets	$ 49,549	$ 53,147
Finance lease assets*	Property and equipment, net	195	287
Total leased assets		$ 49,744	$ 53,434
Liabilities:			
Current:			
Operating	Operating lease liabilities	$ 16,622	$ 17,403
Finance	Accrued expenses and other	398	503
Noncurrent:			
Operating	Operating lease liabilities, net of current	51,599	55,196
Finance	Other long-term liabilities	—	64
Total lease liabilities		$ 68,619	$ 73,166

* Finance lease assets were recorded net of accumulated depreciation of $1.9 million and $1.8 million at March 31, 2022 and December 31, 2021, respectively.

The components of lease expense for the three months ended March 31, 2022 and 2021 were as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Operating lease cost*	$ 4,630	$ 8,837
Finance lease cost:		
Amortization of leased assets	92	229
Interest on lease liabilities	6	26
Short-term lease cost	3,718	3,292
Variable lease costs (costs excluded from minimum fixed lease payments)**	826	2,158
Sublease income	(490)	(276)
Net lease cost	$ 8,782	$ 14,266

* Operating lease costs for the three months ended March 31, 2021 included $3.4 million of accelerated amortization for certain assets partially or fully vacated in 2021 with no intent or ability to sublease. No such accelerated amortization was recorded in the three months ended March 31, 2022.
** Variable lease costs for the three months ended March 31, 2021 included an accrual of $1.4 million for all future estimated variable expenses related to certain assets partially or fully vacated with no intent or ability to sublease. No such variable costs were accrued in the three months ended March 31, 2022.

Cash flow information related to the Company's leases for the three months ended March 31, 2022 and 2021 was as follows (in thousands):

	Three months ended	
	March 31, 2022	March 31, 2021
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows for operating leases	$ 5,578	$ 5,561
Operating cash flows for finance leases	$ 6	$ 26
Financing cash flows for finance leases	$ 198	$ 272

Other information related to the Company's leases as of March 31, 2022 and December 31, 2021 was as follows:

	March 31, 2022	December 31 2021
Weighted average remaining lease term (years):		
Operating leases	6.25	
Finance leases	0.82	
Weighted average discount rate:		
Operating leases	5.72 %	5.
Finance leases	3.74 %	4.

Future minimum fixed lease payments under noncancelable leases at March 31, 2022 were as follows (in thousands):

	March 31, 2022	
	Operating leases	Finance leases
Remainder of 2022	$ 15,153	$ 342
2023	17,802	63
2024	10,469	—
2025	7,539	—
2026	6,488	—
2027 and beyond	24,850	—
Total lease payments	82,301	405
Less: interest	(14,080)	(7)
Present value of lease liabilities	$ 68,221	$ 398

(16) INCOME TAXES

The Company's income tax provisions for the three months ended March 31, 2022 and 2021 reflect the Company's estimates of the effective rates expected to be applicable for the respective full years, adjusted for any discrete events, which are recorded in the period that they occur. These estimates are reevaluated each quarter based on the Company's estimated tax expense for the full year. The estimated effective tax rate includes the impact of valuation allowances in various jurisdictions. The Company intends to continue to maintain a valuation allowance on its deferred tax assets until there is sufficient evidence to support the reversal of all or some portion of the respective allowances.

Beginning in 2022, the Tax Cuts and Jobs Act of 2017 (the "TCJA") eliminates the option to deduct research and development expenditures currently and requires taxpayers to amortize them over five years pursuant to IRC Section 174. Although Congress is considering legislation that would defer the amortization requirement to later years, the Company has no assurance that the provision will be repealed or otherwise modified. If this provision of the TCJA is not repealed or otherwise modified, it will materially reduce the Company's operating cash flows in 2022.

(17) COMMITMENTS AND CONTINGENCIES

Liabilities for Royalty Payments to the IIA

Prior to the ECI Acquisition, ECI had received research and development grants from the Office of the Innovation Authority of the Israeli Ministry of Economics (the "IIA"). The Company assumed ECI's contract with the IIA, which requires the Company to pay royalties to the IIA on proceeds from the sale of products which the Israeli government has supported by way of research and development grants. The royalties for grants prior to 2017 were calculated at the rates of 1.3% to 5.0% of the aggregated proceeds from the sale of such products developed at certain of the Company's R&D centers, up to an amount not exceeding 100% of such grants plus interest at LIBOR. Effective for grants approved in 2017 and subsequently, interest was calculated at the higher of LIBOR plus 1.5% to 2.75%. At March 31, 2022, the Company's maximum possible future royalties commitment, including $4.7 million of unpaid royalties accrued, was $33.3 million, including interest of $2.0 million, based on estimates of future product sales, grants received from the IIA not yet repaid, and management's estimation of products still to be sold.

Research and Development Grants

The Company records grants received from the IIA as a reduction to research and development expense. Royalties payable to the IIA are recognized pursuant to sales of related products and are classified as Cost of revenue. The Company does not anticipate receiving material grants from the IIA in the foreseeable future.

Litigation

On November 8, 2018, Ron Miller, a purported stockholder of the Company, filed a Class Action Complaint (the "Miller Complaint") in the United States District Court for the District of Massachusetts (the "Massachusetts District Court") against the Company and three of its former officers (collectively, the "Defendants"), claiming to represent a class of purchasers of Sonus common stock during the period from January 8, 2015 through March 24, 2015 and alleging violations of the federal securities laws. Similar to a previous complaint entitled Sousa et al. vs. Sonus Networks, Inc. et al., which was dismissed with prejudice by an order dated June 6, 2017, the Miller Complaint claims that the Defendants made misleading forward-looking statements concerning Sonus' expected fiscal first quarter of 2015 financial performance, which statements were also the subject of an August 7, 2018 Securities and Exchange Commission Cease and Desist Order, whose findings the Company neither admitted nor denied. The Miller plaintiffs are seeking monetary damages.

After the Miller Complaint was filed, several parties filed and briefed motions seeking to be selected by the Massachusetts District Court to serve as a Lead Plaintiff in the action. On June 21, 2019, the Massachusetts District Court appointed a group as Lead Plaintiffs and the Lead Plaintiffs filed an amended complaint on July 19, 2019. On August 30, 2019, the Defendants filed a motion to dismiss the Miller Complaint and, on October 4, 2019, the Lead Plaintiffs filed an opposition to the motion to dismiss. There was an oral argument on the motion to dismiss on February 12, 2020, but to date, the court has not ruled on the motion.

In addition, the Company is often a party to disputes and legal proceedings that it considers routine and incidental to its business. Management does not expect the results of any of these actions to have a material effect on the Company's business or condensed consolidated financial statements.

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

The following discussion of the financial condition and results of operations of Ribbon Communications Inc. should be read in conjunction with the condensed consolidated financial statements and the related notes thereto included elsewhere in this Quarterly Report on Form 10-Q and the audited financial statements and notes thereto and Management's Discussion and Analysis of Financial Condition and Results of Operations included in our Annual Report on Form 10-K for the year ended December 31, 2021, which was filed with the U.S. Securities and Exchange Commission on March 11, 2022.

Overview

We are a leading global provider of communications technology to service providers and enterprises. We provide a broad range of software and high-performance hardware products, solutions and services that enable the secure delivery of data and voice communications for residential consumers and for small, medium and large enterprises and industry verticals such as finance, education, government, utilities and transportation. Our mission is to create a recognized global technology leader providing cloud-centric solutions that enable the secure exchange of information, with unparalleled scale, performance and elasticity. Headquartered in Plano, Texas, we have a global presence with research and development and/or sales and support locations in over thirty-five countries around the world.

Impact of COVID-19 on Our Business

The COVID-19 pandemic has had a negative effect on the global economy, disrupting the various manufacturing, commodity and financial markets and increasing volatility, and has impeded global supply chains, including that of our IP Optical Networks segment. Continued uncertain global economic conditions as a result of the continuing COVID-19 pandemic, particularly in areas experiencing higher case numbers as a result of new variants, may cause our customers to restrict spending or delay purchases for an indeterminate period of time and consequently cause our revenues to decline. In addition, our ability to deliver our solutions as agreed upon with our customers depends on the ability of our global contract manufacturers, vendors, licensors and other business partners to deliver products or perform services we have procured from them. The degree to which the continuing COVID-19 pandemic impacts our future business, financial position and results of operations will depend on developments beyond our control, including the effectiveness of vaccines over the long-term or with respect to new variants, the frequency and duration of future waves of infection, the extent of actions to contain or treat the virus, how quickly and to what extent normal economic and operating conditions can result after new future waves, and the severity and duration of the global economic downturn that has resulted from the pandemic.

Presentation

Unless otherwise noted, all financial amounts, excluding tabular information, in this Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") are rounded to the nearest million dollar amount, and all percentages, excluding tabular information, are rounded to the nearest percentage point.

Reclassification of Amortization of Acquired Intangible Assets

In 2021, we reclassified amounts recorded for amortization of certain acquired intangible assets in prior presentations from Total operating expenses under the caption "Amortization of acquired intangible assets" to Total cost of revenue under the caption "Amortization of acquired technology" in the consolidated statements of operations. Our management believes this presentation aids in the comparability of our financial statements to industry peers. These reclassifications did not impact our operating income (loss), net income (loss) or earnings (loss) per share for any historical periods. These reclassifications also did not impact our condensed consolidated balance sheets or statements of cash flows.

This reclassification resulted in $10.1 million recorded to Amortization of acquired technology within Total cost of revenue and a decrease of $10.1 million to Amortization of acquired intangible assets within Total operating expenses in the three months ended March 31, 2021. The increase to Total cost of revenue decreased our gross profit as a percentage of revenue ("gross margin") by approximately five percentage points.

Operating Segments

Our Chief Operating Decision Maker assesses our performance based on the performance of two separate organizations within Ribbon: the Cloud and Edge operating segment ("Cloud and Edge") and the IP Optical Networks operating segment ("IP Optical Networks"). For additional details regarding our operating segments, see Note 12 - Operating Segment Information to our condensed consolidated financial statements.

Financial Overview

Financial Results

We reported losses from operations of $39.1 million and $12.6 million for the three months ended March 31, 2022 and 2021, respectively.

Our revenue was $173.2 million and $192.8 million in the three months ended March 31, 2022 and 2021, respectively. Our gross profit and gross margin were $78.1 million and 45.1%, respectively, in the three months ended March 31, 2022, and $100.5 million and 52.1%, respectively, in the three months ended March 31, 2021.

Revenue from our Cloud and Edge segment was $109.8 million and $125.4 million in the three months ended March 31, 2022 and 2021, respectively. Gross profit and gross margin for this segment were $62.7 million and 57.1%, respectively, in the three months ended March 31, 2022, and $77.5 million and 61.8%, respectively, in the three months ended March 31, 2021.

Revenue from our IP Optical Networks segment was $63.4 million and $67.4 million in the three months ended March 31, 2022 and 2021, respectively. Gross profit and gross margin for this segment were $15.3 million and 24.2%, respectively, in the three months ended March 31, 2022, and $23.0 million and 34.1%, respectively, in the three months ended March 31, 2021.

Our operating expenses were $117.1 million and $113.1 million in the three months ended March 31, 2022 and 2021, respectively. Operating expenses for the three months ended March 31, 2022 included $7.3 million of amortization of acquired intangible assets, $1.8 million of acquisition-, disposal- and integration-related expense, and $4.8 million of restructuring and related expense. Operating expenses for the three months ended March 31, 2021 included $5.8 million of amortization of acquired intangible assets, $1.2 million of acquisition-, disposal- and integration-related expense, and $6.0 million of restructuring and related expense.

We recorded stock-based compensation expense of $4.3 million and $5.1 million in the three months ended March 31, 2022 and 2021, respectively. These amounts are included as components of both Cost of revenue and Operating expenses in our condensed consolidated statements of operations.

See "Results of Operations" in this MD&A for a discussion of the changes in our revenue and expenses for the three months ended March 31, 2022 compared to the three months ended March 31, 2021.

Restructuring and Cost Reduction Initiatives

<u>2022 Restructuring Plan</u>. In February 2022, our Board of Directors approved a strategic restructuring program (the "2022 Restructuring Plan") to streamline the Company's operations in order to support the Company's investment in critical growth areas. The 2022 Restructuring Plan is expected to include, among other things, charges related to a consolidation of facilities and a workforce reduction. Any positions eliminated in countries outside the United States are subject to local law and consultation requirements.

We recorded restructuring and related expense of $4.2 million for severance and related costs for approximately 50 employees in connection with the 2022 Restructuring Plan in the three months ended March 31, 2022. We anticipate that we will record future expense for severance and facility consolidations aggregating approximately $16 million in connection with the 2022 Restructuring Plan.

<u>2020 and 2019 Restructuring Plans</u>. In 2020, we implemented a restructuring plan to eliminate certain positions and redundant facilities, primarily in connection with the ECI Acquisition, to further streamline our global footprint and improve our operations (the "2020 Restructuring Plan"). The 2020 Restructuring Plan included facility consolidations and a reduction in workforce to eliminate redundant functions arising from our acquisition of ECI Telecom Group Ltd. in 2020 (the "ECI Acquisition") and support our efforts to integrate the two companies. At March 31, 2022, the 2020 Restructuring Plan had a remaining accrual of $0.8 million for severance costs that are expected to be paid out over the next year.

In June 2019, we implemented a restructuring plan to streamline our global footprint, improve our operations and enhance our customer delivery (the "2019 Restructuring Plan"). The 2019 Restructuring Plan included facility consolidations, refinement of our research and development activities, and a reduction in workforce. At March 31, 2022, the 2019 Restructuring Plan had a remaining accrual of $1.4 million for facility costs that remain in the plan and which will be paid out over the various lease terms, which range from one to six years.

Accelerated Rent Amortization. Accelerated rent amortization is recognized from the date that we commence the plan to fully or partially vacate a facility, for which there is no intent or ability to enter into a sublease, through the final vacate date. We recorded $3.4 million for accelerated rent amortization in the three months ended March 31, 2021. We did not record accelerated rent amortization in the three months ended March 31, 2022. We continue to evaluate our properties included in our restructuring plans for accelerated amortization and/or right-of-use asset impairment. We may incur additional future expense if we are unable to sublease other locations included in these initiatives.

Critical Accounting Policies and Estimates

Management's discussion and analysis of financial condition and results of operations is based upon our condensed consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP"). The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. We base our estimates and judgments on historical experience, knowledge of current conditions and beliefs of what could occur in the future given available information. We consider the following accounting policies to be both those most important to the portrayal of our financial condition and those that require the most subjective judgment: revenue recognition, the valuation of inventory, the valuation of our investment in American Virtual Cloud Technologies Inc. (the "AVCT Investment"), warranty accruals, loss contingencies and reserves, stock-based compensation, business combinations, goodwill and intangible assets, accounting for leases, and accounting for income taxes. If actual results differ significantly from management's estimates and projections, there could be a material effect on our condensed consolidated financial statements. There were no significant changes to our critical accounting policies from January 1, 2022 through March 31, 2022. For a further discussion of our other critical accounting policies and estimates, please refer to our Annual Report on Form 10-K for the year ended December 31, 2021.

Results of Operations

Three months ended March 31, 2022 and 2021

Revenue. Revenue for the three months ended March 31, 2022 and 2021 was as follows (in thousands, except percentages):

	Three months ended		Decrease from prior year	
	March 31, 2022	March 31, 2021	$	%
Product	$ 81,990	$ 97,889	$ (15,899)	(16.2)%
Service	91,208	94,883	(3,675)	(3.9)%
Total revenue	$ 173,198	$ 192,772	$ (19,574)	(10.2)%

Segment revenue for the three months ended March 31, 2022 and 2021 was as follows (in thousands):

	Three months ended March 31, 2022			Three months ended March 31, 2021		
	Cloud and Edge	IP Optical Networks	Total	Cloud and Edge	IP Optical Networks	Total
Product	$ 37,635	$ 44,355	$ 81,990	$ 50,152	$ 47,737	$ 97,889
Service	72,171	19,037	91,208	75,270	19,613	94,883
Total revenue	$ 109,806	$ 63,392	$ 173,198	$ 125,422	$ 67,350	$ 192,772

The decrease in our product revenue in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was primarily the result of lower sales of our Cloud and Edge SBC products and network transformation products, coupled with lower sales of IP Optical Networks products.

Revenue from indirect sales through our channel partner program was 29% and 21% of our product revenue in the three months ended March 31, 2022 and 2021, respectively. Revenue from sales to enterprise customers was 27% and 23% of our product revenue in the three months ended March 31, 2022 and 2021, respectively. These sales were made through both our direct sales team and indirect sales channel partners.

The timing of the completion of customer projects and revenue recognition criteria satisfaction may cause our product revenue to fluctuate from one period to the next.

Service revenue is primarily comprised of hardware and software maintenance and support ("maintenance revenue") and network design, installation and other professional services ("professional services revenue").

Service revenue for the three months ended March 31, 2022 and 2021 was comprised of the following (in thousands, except percentages):

	Three months ended		Decrease from prior year	
	March 31, 2022	March 31, 2021	$	%
Maintenance	$ 68,605	$ 68,705	$ (100)	(0.1)%
Professional services	22,603	26,178	(3,575)	(13.7)%
	$ 91,208	$ 94,883	$ (3,675)	(3.9)%

Segment service revenue for the three months ended March 31, 2022 and 2021 was comprised of the following (in thousands):

	Three months ended March 31, 2022			Three months ended March 31, 2021		
	Cloud and Edge	IP Optical Networks	Total	Cloud and Edge	IP Optical Networks	Total
Maintenance	$ 55,030	$ 13,575	$ 68,605	$ 54,673	$ 14,032	$ 68,7
Professional services	17,141	5,462	22,603	20,597	5,581	26,1
Total service revenue	$ 72,171	$ 19,037	$ 91,208	$ 75,270	$ 19,613	$ 94,8

Maintenance revenue was essentially flat in the three months ended March 31, 2022 compared to the three months ended March 31, 2021. The increase in our Cloud and Edge segment's maintenance revenue was virtually offset by the decrease in our IP Optical Networks segment's maintenance revenue.

Professional services revenue from our Cloud and Edge segment decreased by $3 million in three months ended March 31, 2022 compared to the three months ended March 31, 2021 due to scheduling delays in several network transformation projects. We expect these delayed projects will be completed later in the current year.

The following customer contributed 10% or more of our revenue in the three month periods ended March 31, 2022 and 2021:

	Three months ended	
Customer	March 31, 2022	March 31, 2021
Verizon Communications Inc.	13%	16%

Revenue from customers domiciled outside the United States comprised 56% and 59% of revenue in the three months ended March 31, 2022 and 2021, respectively. Due to the timing of project completions, we expect that the domestic and international components as a percentage of revenue may fluctuate from quarter to quarter and year to year.

Our deferred product revenue was $9 million and $10 million at March 31, 2022 and December 31, 2021, respectively. Our deferred service revenue was $119 million and $120 million at March 31, 2022 and December 31, 2021, respectively. Our deferred revenue balance may fluctuate because of the timing of revenue recognition, customer payments, maintenance contract renewals, contractual billing rights and maintenance revenue deferrals included in multiple element arrangements.

We expect that our total revenue will increase in 2022 compared to 2021 as a result of both increased customer spend and continued cross-selling opportunities.

Cost of Revenue/Gross Margin. Our cost of revenue consists primarily of amounts paid to third-party manufacturers for purchased materials and services, royalties, inventory valuation adjustments, warranty costs, manufacturing and services personnel and related costs, and amortization of acquired technology. Our cost of revenue and gross margins for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	Three months ended		Increase (decrease) from prior year	
	March 31, 2022	March 31, 2021	$	%
Cost of revenue:				
Product	$ 51,209	$ 44,445	6,764	15.2 %
Service	35,667	37,780	(2,113)	(5.6)%
Amortization of acquired technology	8,267	10,061	(1,794)	(17.8)%
Total cost of revenue	$ 95,143	$ 92,286	2,857	3.1 %
Gross profit	$ 78,055	$ 100,486	$ (22,431)	(22.3)%
Gross margin	45.1 %	52.1 %		

Our segment cost of revenue and gross margins for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	Three months ended March 31, 2022			Three months ended March 31, 2021		
	Cloud and Edge	IP Optical Networks	Total	Cloud and Edge	IP Optical Networks	Total
Product	$ 16,999	$ 34,210	$ 51,209	$ 13,421	$ 31,024	$ 44,4
Service	24,899	10,768	35,667	27,839	9,941	37,7
Amortization of acquired technology	5,176	3,091	8,267	6,639	3,422	10,0
Total cost of revenue	$ 47,074	$ 48,069	$ 95,143	$ 47,899	$ 44,387	$ 92,2
Total gross margin	57.1 %	24.2 %	45.1 %	61.8 %	34.1 %	52.1

The decrease in our gross margin in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was primarily due to higher component costs, expedite and production fees, and logistics expenses in both of our segments, product and customer mix, which decreased our gross margin by seven percentage points.

We believe that our gross margin may decrease in 2022 compared to 2021 as a result of higher expected sales from IP Optical Networks, which has lower margins due to the higher hardware content in its products, and higher production costs resulting from ongoing worldwide supply chain issues.

Research and Development Expenses. Research and development expenses consist primarily of salaries and related personnel expenses and prototype costs for the design, development, testing, and enhancement of our products. Research and development expenses for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	March 31, 2022	March 31, 2021	Increase from prior year	
			$	%
Three months ended	$ 52,690	$ 47,410	$ 5,280	11.1 %

The increase in our research and development expenses in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was primarily due to $4 million of higher product development costs and $3 million of higher employee-related expenses in our IP Optical Networks segment, partially offset by lower expenses in our Cloud and Edge segment aggregating $2 million.

Some aspects of our research and development efforts require significant short-term expenditures, the timing of which may cause significant variability in our expenses. We believe that rapid technological innovation is critical to our long-term success, and we are tailoring our investments to meet the requirements of our customers and market. We believe that our research and development expense will increase modestly in 2022 compared to 2021, primarily due to our incremental investment in critical growth areas, partially offset by cost savings from the 2022 Restructuring Plan.

Sales and Marketing Expenses. Sales and marketing expenses primarily consist of salaries and related personnel costs, commissions, travel and entertainment expenses, promotions, customer trial and evaluations inventory, and other marketing and sales support expenses. Sales and marketing expenses for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	March 31, 2022	March 31, 2021	Increase from prior year	
			$	%
Three months ended	$ 37,619	$ 37,218	$ 401	1.1 %

The increase in sales and marketing expenses in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was attributable to higher expenses in our IP Optical Networks segment, partially offset by lower Cloud and Edge expenses, principally employee-related costs.

We believe that our 2022 sales and marketing expenses will be consistent with 2021 levels.

General and Administrative Expenses. General and administrative expenses consist primarily of salaries and related personnel costs for executive and administrative personnel, and audit, legal and other professional fees. General and administrative expenses for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	March 31, 2022	March 31, 2021	Decrease from prior year	
			$	%
Three months ended	$ 12,862	$ 15,553	$ (2,691)	(17

The decrease in general and administrative expenses in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was primarily attributable to lower employee-related expenses of $1.4 million and $1.1 million in our Cloud and Edge and IP Optical Networks segments, respectively, in the current year period.

Although our general and administrative expenses decreased 17% in the three months ended March 31, 2022 compared to the three months ended March 31, 2021, we believe that our general and administrative expenses will decrease only slightly for the full year 2022 compared to our 2021 levels.

Amortization of Acquired Intangible Assets. Amortization of acquired intangible assets included in Operating expenses for the three months ended March 31, 2022 and 2021 was as follows (in thousands, except percentages):

	March 31, 2022	March 31, 2021	Increase from prior year	
			$	%
Three months ended	$ 7,275	$ 5,762	$ 1,513	26

The increase in amortization of acquired intangible assets included in operating expenses ("Opex Amortization") in the three months ended March 31, 2022 compared to the three months ended March 31, 2021 was primarily due to higher expense related to customer lists recorded in connection with the ECI Acquisition. Opex Amortization is not recorded on a straight-line basis; rather, it is recorded in relation to expected future cash flows. Accordingly, such expense may vary from one period to the next.

Acquisition-, Disposal- and Integration-Related. Acquisition-, disposal- and integration-related expenses include those expenses related to acquisitions that we would otherwise not have incurred. Acquisition- and disposal-related expenses include professional and services fees, such as legal, audit, consulting, paying agent and other fees. Integration-related expenses represent incremental costs related to combining our systems and processes with those of acquired businesses, such as third-party consulting and other third-party services.

Our acquisition-, disposal- and integration-related expenses were $1.8 million and $1.2 million in the three months ended

March 31, 2022 and 2021, respectively. The amount for the three months ended March 31, 2022 primarily relates to integration-related expenses. The amount for the three months ended March 31, 2021 was comprised of $1.0 million of integration-related expenses and $0.2 million for professional and services fees in connection with the sale of our Kandy Communications business to American Cloud Technologies, Inc. ("AVCT") on December 1, 2020 (the "Kandy Sale").

Restructuring and Related. We have been committed to streamlining our operations and reducing operating costs by closing and consolidating certain facilities and reducing our worldwide workforce. Please see the additional discussion of our restructuring initiatives in the "Restructuring and Cost Reduction Initiatives" section of the Overview of this MD&A.

We recorded restructuring and related expense of $4.8 million and $6.0 million in the three months ended March 31, 2022 and March 31, 2021, respectively. Although we have eliminated positions as part of our restructuring initiatives, we continue to hire in certain areas that we believe are important to our future growth.

Interest Expense, Net. Interest income and interest expense for the three months ended March 31, 2022 and 2021 were as follows (in thousands, except percentages):

	Three months ended		Decrease from prior year	
	March 31, 2022	March 31, 2021	$	%
Interest income	$ 39	$ 1,485	$ (1,446)	(97.4)%
Interest expense	(4,040)	(7,304)	(3,264)	(44.7)%
Interest expense, net	$ (4,001)	$ (5,819)	$ (1,818)	(31.2)%

We recorded nominal interest income in the three months ended March 31, 2022. We received debentures (the "Debentures") and warrants in connection with the Kandy Sale. The Debentures bore interest at 10% per annum. We recorded $1.5 million of interest income in the three months ended March 31, 2021, which was added to the principal amount of the Debentures, and which is included in Interest expense, net, in our condensed consolidated statement of operations for that period. The Debentures were converted to shares of AVCT common stock on September 8, 2021. Interest expense in the three months ended March 31, 2022 primarily represented interest and debt issuance costs in connection with the 2020 Credit Facility (as defined below). Interest expense in the three months ended March 31, 2021 was primarily comprised of interest and debt issuance costs in connection with the 2020 Credit Facility, including the write-off of $2.5 million of capitalized debt issuance costs in connection with the Third Amendment (as defined below).

Other Expense, Net. We recorded other expense, net, aggregating $28.8 million and $25.4 million in the three months ended March 31, 2022 and 2021, respectively. The primary component in both periods was losses from the change in the fair value of the AVCT Investment, which were $27.0 million and $23.9 million in the three months ended March 31, 2022 and 2021, respectively.

Income Taxes. We recorded an income tax benefit of $1.9 million in the three months ended March 31, 2022 and an income tax provision of $0.8 million in the three months ended March 31, 2021. These amounts reflect our estimates of the effective rates expected to be applicable for the respective full fiscal years, adjusted for any discrete events, which are recorded in the period that they occur. These estimates are reevaluated each quarter based on our estimated tax rate for the full fiscal year. The estimated effective tax rate includes the impact of valuation allowances in various jurisdictions.

Beginning in 2022, the Tax Cuts and Jobs Act of 2017 (the "TCJA") eliminates the option to deduct research and development expenditures currently and requires taxpayers to amortize them over five years pursuant to IRC Section 174. Although Congress is considering legislation that would defer the amortization requirement to later years, we have no assurance that the provision will be repealed or otherwise modified. If this provision of the TCJA is not repealed or otherwise modified, it will materially reduce our operating cash flows in 2022.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements that have or are reasonably likely to have a current or future material effect on our financial position, changes in financial position, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources.

Liquidity and Capital Resources

Our condensed consolidated statements of cash flows are summarized as follows (in thousands):

	Three months ended March 31, 2022	Three months ended March 31, 2021	Change
Net loss	$ (69,975)	$ (44,687)	$ (25,288)
Adjustments to reconcile net loss to cash flows provided by (used in) operating activities	45,568	52,700	(7,132)
Changes in operating assets and liabilities	39,437	(14,225)	53,662
Net cash provided by (used in) operating activities	$ 15,030	$ (6,212)	$ 21,242
Net cash used in investing activities	$ (3,471)	$ (5,357)	$ 1,886
Net cash used in by financing activities	$ (22,395)	$ (14,777)	$ (7,618)

Our cash and restricted cash aggregated $95 million at March 31, 2022 and $106 million at December 31, 2021. These amounts included cash and restricted cash aggregating $55 million at March 31, 2022 and $60 million at December 31, 2021 held by our non-U.S. subsidiaries. If we elected to repatriate all excess funds held by our non-U.S. subsidiaries as of March 31, 2022, we do not believe that the amounts of potential withholding taxes that would arise from the repatriation would have a material effect on our liquidity.

We currently maintain the Senior Secured Credit Facilities Credit Agreement (as amended, the "2020 Credit Facility"), by and among us, as a guarantor, Ribbon Communications Operating Company, Inc., as the borrower ("Borrower"), Citizens Bank, N.A. ("Citizens"), as administrative agent, a lender, issuing lender, swingline lender, joint lead arranger and bookrunner, Santander Bank, N.A., as a lender, joint lead arranger and bookrunner, and the other lenders party thereto (each, together with Citizens Bank, N.A. and Santander Bank, N.A., referred to individually as a "Lender", and collectively, the "Lenders"). For additional details regarding the terms of the 2020 Credit Facility, see Note 9 to our condensed consolidated financial statements.

On March 3, 2021 (the "Third Amendment Effective Date"), we entered into a Third Amendment to Credit Agreement (the "Third Amendment"), which further amended the 2020 Credit Facility. The Third Amendment provided for an incremental term loan facility to us in the original principal amount of $74.6 million, the proceeds of which were used on the Third Amendment Effective Date to consummate an open market purchase of all outstanding amounts under the Term B Loan. Upon the consummation of the open market purchase, the Term B Loans were assigned to the Borrower and immediately canceled, such that the outstanding amount under the Term A Loan and incremental term loan facility were combined and held by the Lenders (the "2020 Term Loan").

On March 10, 2022, we entered into a Fourth Amendment to the 2020 Credit Facility (the "Fourth Amendment") to increase the Maximum Consolidated Net Leverage Ratio (as defined in the 2020 Credit Facility) to 4.25:1.00 for the first quarter of 2022 and 4.50:1.00 for the second quarter of 2022, with reductions in subsequent quarters through the third quarter of 2023, when the ratio will be fixed at 3.00:1.00. In connection with the Fourth Amendment, we made a $15.0 million prepayment that was applied to the final payment due on the maturity date.

Subsequent to the Fourth Amendment, we are required to make quarterly principal payments on the 2020 Term Loan aggregating approximately $20 million per year for the next two years and $30 million in the following year, with the final payment approximating $285 million due on the maturity date.

At March 31, 2022, we had an outstanding 2020 Term Loan balance of $355.5 million at an average interest rate of 3.4% and $4.4 million of letters of credit outstanding with an interest rate of 2.5%. We were in compliance with all covenants of the 2020 Credit Facility at both March 31, 2022 and December 31, 2021.

We are exposed to financial market risk related to foreign currency fluctuations and changes in interest rates. These exposures are actively monitored by management. To manage the volatility related to the exposure to changes in interest rates, we have entered into a derivative financial instrument. Management's objective is to reduce, where it is deemed appropriate to do so, fluctuations in earnings and cash flows associated with changes in interest rates. Our policies and practices are to use derivative financial instruments only to the extent necessary to manage exposures. We do not hold or issue derivative financial instruments for trading or speculative purposes.

As a result of exposure to interest rate movements, during March 2020, we entered into an interest rate swap arrangement, which effectively converted our $400 million term loan with its variable interest rate based upon one-month LIBOR to an aggregate fixed rate of 0.904%, plus a leverage-based margin as defined in the 2020 Credit Facility. The notional amount of this swap as of March 31, 2022 was $400 million, and the swap matures on March 3, 2025, the same date the 2020 Credit Facility matures.

Our objectives in using interest rate derivatives are to add stability to interest expense and to manage our exposure to interest rate movements. To accomplish this objective, we are using an interest rate swap as part of our interest rate risk management strategy. Interest rate swaps designated as cash flow hedges involve the receipt of variable amounts from a counterparty in exchange for making fixed-rate payments over the life of the agreements without exchange of the underlying notional amount.

The effective portion of changes in the fair value of derivatives designated and that qualify as cash flow hedges is recorded in accumulated other comprehensive income in the condensed consolidated balance sheet and is subsequently reclassified into earnings in the period that the hedged forecasted transactions affect earnings. During the three months ended March 31, 2022 and 2021, such a derivative was used to hedge the variable cash flows associated with the 2020 Credit Facility. Any ineffective portion of the change in fair value of the derivative would be recognized directly in earnings. However, during the three months ended March 31, 2022 and 2021, we recorded no hedge ineffectiveness.

Amounts reported in accumulated other comprehensive income related to our derivative will be reclassified to interest expense as interest is accrued on our variable-rate debt. Based upon projected forward rates, we estimate as of March 31, 2022 that $2.7 million may be reclassified as a decrease to interest expense over the next 12 months.

We use letters of credit, performance and bid bonds in the course of our business. At March 31, 2022, we had letters of credit, bank guarantees, and performance and bid bonds outstanding (collectively, "Guarantees") aggregating $30.7 million, comprised of the $4.4 million of letters of credit under the 2020 Credit Facility described above (the "Letters of Credit") and $26.3 million of bank guarantees and performance and bid bonds (collectively, the "Other Guarantees") under various uncommitted facilities. At December 31, 2021, we had $30.1 million of Guarantees, comprised of $4.3 million of Letters of Credit and $25.8 million of Other Guarantees. At both March 31, 2022 and December 31, 2021, the Company had cash collateral of $2.6 million supporting the Guarantees, which are reported as Restricted cash in our condensed consolidated balance sheets.

Cash Flows from Operating Activities

Our primary source of cash from operating activities has been from cash collections from our customers. We expect cash flows from operating activities to be affected by increases and decreases in sales volumes and timing of collections, and by purchases and shipments of inventory. Our primary uses of cash for operating activities have been for personnel costs and investment in our research and development and in our sales and marketing, and general and administrative departments.

Cash provided by operating activities in the three months ended March 31, 2022 was $15.0 million, primarily resulting from lower accounts receivable and certain non-cash expenses, such as the decrease in the fair value of the AVCT Investment, amortization of intangible assets, stock-based compensation, depreciation and amortization of property and equipment, and foreign currency losses. These amounts were partially offset by our net loss, higher inventory, lower accrued expenses and other long-term liabilities, and a non-cash adjustment to deferred income taxes. Our lower accounts receivable was primarily due to the collection in the quarter of seasonally higher amounts outstanding at December 31, 2021.

Our operating activities used $6.2 million in the three months ended March 31, 2021, primarily the result of our net loss, lower accrued expenses and other long-term liabilities, lower accounts payable, and higher inventory. These amounts were partially offset by lower accounts receivable, higher deferred revenue, lower other operating assets, and certain non-cash expenses, such as the decrease in the fair value of the AVCT Investment, amortization of intangible assets, stock-based compensation, depreciation and amortization of property and equipment, and amortization of debt issuance costs. Our lower accounts receivable was primarily due to the collection in the quarter of seasonally higher amounts outstanding at December 31, 2020. The decrease in accrued expenses and other long-term liabilities was primarily due to the cash payments in the quarter related to our employee cash bonus program.

Cash Flows from Investing Activities

Our investing activities used $3.5 million and $5.4 million of cash in the three months ended March 31, 2022 and 2021, respectively, to purchase property and equipment.

Cash Flows from Financing Activities

Our financing activities used $22.4 million of cash in the three months ended March 31, 2022, primarily due to $20.0 million of principal payments on the 2020 Credit Facility, including the $15.0 million incremental principal payment in connection with the Fourth Amendment, and $1.8 million for the payment of tax withholding obligations related to the net share settlement of restricted stock awards upon vesting. Payments of debt issuance costs and principal payments of finance leases totaled less than $1 million.

Our financing activities used $14.8 million of cash in the three months ended March 31, 2021, primarily due to $74.6 million of proceeds from the incremental loan obtained in connection with the Third Amendment, which amount was used to consummate an open market purchase of all outstanding amounts under the Term B Loan, $11.2 million for the payment of tax withholding obligations related to the net share settlement of restricted stock awards upon vesting, and $77.1 million of principal payments of term debt, including the $74.6 million payoff of the Term B Loan in connection with the Third Amendment, $0.8 million of payments of debt issuance costs, and $0.3 million for principal payments of finance leases.

Under the 2020 Credit Facility, we are required to maintain compliance with certain financial covenants. As of March 31, 2022, we were in compliance with our financial covenants. Due to the impact of market conditions on its forecast, including supply chain disruptions, higher costs, and other geopolitical instabilities and disputes, we project that we may not maintain compliance with our financial covenants under the 2020 Credit Facility, as amended, for the quarters ended June 30, 2022 and September 30, 2022. Failure to remain in compliance would be an event of default that would permit the Lenders to accelerate the maturity of the 2020 Credit Facility. As of the date of the issuance of our condensed consolidated financial statements, we currently do not have sufficient cash on hand or available liquidity to repay the outstanding balance of $355.5 million as of March 31, 2022, in the event the debt is accelerated.

Management's plans to avoid any potential event of default include raising additional cash that would allow us to pay down debt in order to remain in compliance with our financial covenants. We have or are in the process of obtaining agreements with certain vendors and with certain lending institutions that allow us to factor additional trade receivables. In addition, we have the ability to sell our derivative financial instrument and our investment in equity securities, which had an aggregate fair market value of $34 million as of March 31, 2022. Lastly, we would evaluate the timing of our capital spending and extension of our payment terms with vendors as needed.

In addition to the above plans, we have entered into discussions with our Lenders to seek a further amendment to the 2020 Credit Facility to adjust the covenants, and we believe the likelihood of completion is reasonably likely. However, an amendment has not been finalized and is not within our control.

We believe our plans are probable of being successfully implemented, which will result in adequate cash to allow us to pay down debt to meet our financial covenant requirements.

Based on our current expectations, we believe our current cash and available borrowings under the 2020 Credit Facility, along with management's plans as outlined above, will be sufficient to meet our anticipated cash needs for working capital and capital expenditures for at least twelve months. The rate at which we consume cash is dependent on the cash needs of our future operations, including our contractual obligations at March 31, 2022, primarily comprised of our debt principal and interest obligations as described above, and our operating lease and purchase obligations. Our operating lease obligations totaled $82 million at March 31, 2022, with payments aggregating $15 million in the remainder of 2022, $18 million in 2023, $10 million in 2024 and $39 million thereafter. Our purchase obligations for 2022 aggregate $139 million. We anticipate devoting substantial capital resources to continue our research and development efforts, to maintain our sales, support and marketing, to complete acquisition-related integration activities and for other general corporate activities. We further believe that our financial resources, along with managing discretionary expenses, will allow us to manage the anticipated impact of the COVID-19 pandemic on our business operations. Looking ahead, we have developed contingency plans to reduce costs further if the situation deteriorates. The challenges posed by the COVID-19 pandemic on our business continue to evolve rapidly. Consequently, we continue to evaluate our financial position in light of future developments, particularly those relating to the COVID-19 pandemic. However, it is difficult to predict future liquidity requirements with certainty, and our cash and available borrowings under the 2020 Credit Facility may not be sufficient to meet our future needs, which would require us to refinance our debt and/or obtain additional financing. We may not be able to refinance our debt or obtain additional financing on favorable terms or at all.

Recent Accounting Pronouncements

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers* ("ASU 2021-08"), which amends ASC 805, *Business Combinations (Topic 805)*, to add contract assets and contract liabilities to the list of exceptions to the recognition and measurement principles that apply to business combinations and to require that an acquiring entity recognize and measure contract assets and contract liabilities acquired in a business combination in accordance with ASC 606, *Revenue from Contracts with Customers (Topic 606)* ("ASC 606"). Under current GAAP, an acquirer generally recognizes such items at fair value on the acquisition date. While primarily related to contract assets and contract liabilities that were accounted for by the acquiree in accordance with ASC 606, ASU 2021-08 also applies to contract assets and contract liabilities from other contracts to which the provisions of ASC 606 apply, such as contract liabilities from the sale of nonfinancial assets within the scope of ASU 2017-05, *Other Income - Gains and Losses from the Derecognition of Nonfinancial Assets (Subtopic 610-20)*. ASU 2021-08 is effective for us January 1, 2023, with early adoption permitted. We believe that the adoption of ASU 2021-08 could have a material impact on our consolidated financial statements for periods including and subsequent to significant business acquisitions.

In January 2021 the FASB issued ASU 2021-01, *Reference Rate Reform (Topic 848): Scope* ("ASU 2021-01"), which refines the scope of ASC 848, *Reference Rate Reform*, and clarifies some of its guidance as part of the FASB's monitoring of global reference rate reform activities. ASU 2021-01 permits entities to elect certain optional expedients and exceptions when accounting for derivative contracts and certain hedging relationships affected by changes in the interest rates used for discounting cash flows, for computing variation margin settlements, and for calculating price alignment interest in connection with reference rate reform activities under way in global financial markets (the "discounting transition"). ASU 2021-01 is effective for us prospectively in any period through December 31, 2022 that a modification is made to the terms of the derivatives affected by the discounting transition. The adoption of ASU 2021-01 did not have a material impact on our consolidated financial statements.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to financial market risk related to foreign currency fluctuations and changes in interest rates. Except as presented below, there have been no material changes in market risk from the information provided in Item 7A. Quantitative and Qualitative Disclosures About Market Risk of our Annual Report on Form 10-K, for the year ended December 31, 2021.

To manage the volatility related to the exposure to changes in interest rates, we have entered into a derivative financial instrument. Our objective is to reduce, where it is deemed appropriate to do so, fluctuations in earnings and cash flows associated with changes in interest rates. Our policies and practices are to use derivative financial instruments only to the extent necessary to manage exposures. We do not hold or issue derivative financial instruments for trading or speculative purposes.

Amounts reported in accumulated other comprehensive income related to our derivative will be reclassified to interest expense as interest is accrued on our variable-rate debt. The fair value of our derivative was an asset of $17.3 million at March 31, 2022. Based upon projected forward rates, we estimate as of March 31, 2022 that $2.7 million may be reclassified as a decrease to interest expense over the next twelve months.

Item 4. Controls and Procedures

Disclosure Controls and Procedures

Evaluation of Disclosure Controls and Procedures. Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on this evaluation, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective as of March 31, 2022.

Changes in Internal Control over Financial Reporting. There have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the fiscal quarter ended March 31, 2022 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II OTHER INFORMATION

Item 1. Legal Proceedings

We are subject to legal proceedings and claims that have not been fully resolved and that have arisen in the ordinary course of business. Our material legal proceedings as described in Part I, Item 1 of this Form 10-Q in the Notes to Condensed Consolidated Financial Statements in Note 17, "Commitments and Contingencies," under the heading "Litigation."

The outcome of litigation is inherently uncertain. If one or more legal matters were resolved against the Company in a reporting period for amounts above management's expectations, our financial condition and operating results for that reporting period could be materially adversely affected. We settled certain matters during the first quarter of 2021 that did not individually or in the aggregate have a material impact on our financial condition or results of operations.

Item 1A. Risk Factors

Our business faces significant risks and uncertainties, which may have a material adverse effect on our business prospects, financial condition and results of operations, and you should carefully consider them. There have been no material changes in the three months ended March 31, 2022 to the risk factors described in Part I, Item 1A. of our Annual Report on Form 10-K for the year ended December 31, 2021.

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

(c) Issuer Purchases of Equity Securities

The following table provides information with respect to the shares of common stock repurchased by us for the periods indicated:

Period	Total Number of Shares Purchased (1)	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Approximate Dollar Value of Shares that May Yet be Purchased Under the Plans or Programs
January 1, 2022 to January 31, 2022	58,535	$ 5.86	—	$ —
February 1, 2022 to February 28, 2022	758	$ 4.36	—	$ —
March 1, 2022 to March 31, 2022	511,153	$ 2.86	—	$ —
Total	570,446	$ 3.17	—	$ —

(1) Upon vesting of restricted stock awards, certain of our employees surrender to us a portion of the newly vested shares of common stock to satisfy the tax withholding obligations that arise in connection with such vesting. During the first quarter of 2022, 570,446 shares of restricted stock were returned to us by employees to satisfy tax withholding obligations arising in connection with vesting of restricted stock, which shares are included in this column.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit No.	Description
2.1	Agreement and Plan of Merger, dated as of November 14, 2019, by and among the Registrant, Ribbon Communications Israel Ltd., Eclipse Communications Ltd., ECI Telecom Group Ltd. and ECI Holding (Hungary) Korlátolt Felelősségű Társág (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K, filed November 14, 2019 with the SEC).
2.2	Amended and Restated Purchase Agreement, dated December 1, 2020, among Ribbon Communications Inc., Ribbon Communications Operating Company, Inc., Ribbon Communications International Limited and American Virtual Cloud Technologies, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K, filed December 7, 2020 with the SEC).
3.1	Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K12B, filed October 30, 2017 with the SEC).
3.2	Certificate of Amendment of the Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed November 28, 2017 with the SEC).
3.3	Amended and Restated By-Laws of the Registrant (incorporated by reference to Exhibit 3.3 to the Registrant's Annual Report on Form 10-K, filed March 8, 2018 with the SEC).
10.1	Fourth Amendment to Credit Agreement, dated March 11, 2022, among Ribbon Communications Operating Company, Inc., as the borrower, the guarantors party thereto, the financial institutions party thereto as lenders, and Citizens Bank, N.A., as administrative agent (incorporated by reference to Exhibit 10.45 to the Registrant's Annual Report on Form 10-K, filed March 11, 2022 with the SEC).
31.1 *	Certificate of Ribbon Communications Inc. Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2 *	Certificate of Ribbon Communications Inc. Chief Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1 #	Certificate of Ribbon Communications Inc. Chief Executive Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2 #	Certificate of Ribbon Communications Inc. Chief Financial Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS *	Inline XBRL Instance Document
101.SCH *	Inline XBRL Taxonomy Extension Schema
101.CAL *	Inline XBRL Taxonomy Extension Calculation Linkbase
101.DEF *	Inline XBRL Taxonomy Extension Definition Linkbase
101.LAB *	Inline XBRL Taxonomy Extension Label Linkbase
101.PRE *	Inline XBRL Taxonomy Extension Presentation Linkbase
104 *	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

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* Filed herewith.

\# Furnished herewith.

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: May 10, 2022	RIBBON COMMUNICATIONS INC.
	By: /s/ Miguel A Lopez
	Miguel A. Lopez Executive Vice President and Chief Financial Officer (Principal Financial Officer)

EXHIBIT 31.1

CERTIFICATION

I, Bruce McClelland, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Ribbon Communications 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: May 10, 2022

/s/ Bruce McClelland

Bruce McClelland
President and Chief Executive Officer
(Principal Executive Officer)

EXHIBIT 31.2

CERTIFICATION

I, Miguel A. Lopez, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Ribbon Communications 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: May 10, 2022

/s/ Miguel A. Lopez

Miguel A. Lopez
Executive Vice President and Chief Financial Officer
(Principal Financial Officer)

EXHIBIT 32.1

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 on Form 10-Q of Ribbon Communications Inc. (the "Company") for the period ended March 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Bruce McClelland, President and Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his 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.

Date: May 10, 2022

/s/ Bruce McClelland

Bruce McClelland
President and Chief Executive Officer
(Principal Executive Officer)

EXHIBIT 32.2

**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 on Form 10-Q of Ribbon Communications Inc. (the "Company") for the period ended March 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Miguel A. Lopez, Executive Vice President and Chief Financial Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his 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.

Date: May 10, 2022

/s/ Miguel A. Lopez

Miguel A. Lopez
Executive Vice President and Chief Financial Officer
(Principal Financial Officer)