

FOCUS

Investment Banking

Telecom Technology and Services Group

Carrier-Focused Telecom Technology Quarterly



Investment Banking and Advisory Services

FOCUS Investment Banking LLC is a leading investment bank with specialized telecom technology and services expertise, concentrating on providing highly tailored services to emerging middle market and larger organizations in this sector:

- Mergers & Acquisition Advisory
- Corporate Development Consulting
- Strategic Partnering & Alliances
- Capital Financing, Debt & Equity
- Corporate Valuations

Summer 2023

Vol. 13, No. 3

IN THIS ISSUE

- 2 Introduction and Sub Sector Definitions
- 3 Summary Comments: Public Markets
- 5 Carrier-Focused Telecom Technology: Public Market Summary
- 6 M&A Summary Comments
- 7 M&A Announced Transactions
- 7 M&A Announced Transactions with Revenue Multiples
- 8 Sub Sector Analysis: Large Cap
- 9 Sub Sector Analysis: OSS/BSS Software
- 10 Sub Sector Analysis: IP Networking
- 11 Sub Sector Analysis: Wireline Access and Transport
- 12 Sub Sector Analysis: Cable and Video
- 13 Sub Sector Analysis: Broadband Wireless
- 14 Sub Sector Analysis: Test and Measurement
- 15 FOCUS Telecom Technology and Services Team

Carrier-Focused Telecom Technology Quarterly

By Richard Pierce, FOCUS Managing Director and Telecom Technology and Services Team Leader

FOCUS believes that the Carrier-Focused Telecom Technology sector is one of the most important in Telecom. As communications service providers struggle to keep up with ever increasing demand from their data hungry customers, they are turning to their technology partners to help them satisfy these needs in a cost-effective way. In addition to simply increasing the capacity of both wireline and wireless networks, companies in the Carrier-Focused Telecom Technology sector are also helping customers perform a variety of other critical functions including network planning and optimization, network monitoring, service assurance, network testing and service delivery and monetization. While some of the largest technology companies in the world are helping to meet many of these challenges, we believe there is significant innovation among middle market technology providers and ample opportunities for them to create meaningful value for their shareholders. FOCUS is proud of its commitment to the Carrier-Focused Telecom Technology sector and we are excited about the prospects for middle market companies in this space.

The FOCUS Telecom Technology and Services group consists of professionals with substantial expertise in both Telecom and investment banking. The FOCUS Telecom team is uniquely qualified to help middle market clients reach their strategic objectives because the group:

- Devotes significant senior level resources to executing transactions for lower middle market clients,
- Has a breadth of knowledge that covers most segments of the telecom industry,
- Has a proven transaction methodology for delivering results,
- Is equally comfortable with buy side and sell side M&A,
- Leverages an experienced team of research professionals,
- Has a national presence with coverage of both East and West coasts.

Sub Sector Definitions

Large Cap: Large, diversified companies with products across a variety of sub sectors

OSS/BSS Software: Software systems that manage and bill the customer base and monitor and maintain telecom networks

IP Networking: Carrier Ethernet switching, routers and IP Multimedia Subsystem ("IMS") components

Wireline Access and Transport: DSL equipment, PON equipment and WDM-based transport

Cable and Video: Products such as headends and servers that support video delivery as well as broadband products for cable networks

Broadband Wireless: High capacity, fixed wireless equipment

Test and Measurement: Equipment used by both service providers and manufacturers to test and monitor networks and equipment

Summary Comments

Public Markets

The FOCUS Carrier-Focused Telecom Technology Index (CFTTI) continued to trend lower with a 2.2% drop in our summer reporting period. This performance was significantly worse than the 5.3% gain in the S&P 500 and the 12.9% gain in the NASDAQ over the same time period. Even after this period's losses, the sector moved into positive territory for the full year with a gain of 0.3%. Once again, this lagged the performance of the S&P 500 and NASDAQ, which gained 1.2% and 7.1%, respectively, over the past 12 months. Sector multiples are largely unchanged from this same time last year. The sector revenue multiple dipped slightly from 2.1x to 2.0x, while the EBITDA multiple held steady at 10.1x.

Large Cap

The Large Cap sub sector was one of the three sub sectors in the CFTTI that were in the black for the past three months. The sub sector gained 0.6%, driven by a 2.6% gain at Cisco and a 6.4% gain at ZTE. Other companies in the sub sector did not fare as well, including a 6.2% decline at Ericsson and a 13.0% decline at Nokia. It is a similar picture for the full year period, with the sub sector's 3.5% year-over-year gain entirely the result of increases at Cisco and ZTE. Sub sector multiples were largely unchanged from this time last year. The revenue multiple declined slightly from 2.0x to 1.9x, but the EBITDA multiple ticked up from 9.4x a year ago to 9.5x currently.

OSS/BSS Software

OSS/BSS Software was another sub sector that just managed to keep its head above water with a three-month gain of 0.8%. Six of the eight companies in the sub sector traded lower this period, but a 2.8% gain at Amdocs and a 7.3% gain at NetScout pulled the entire sub sector into positive territory. The sub sector is still down year-over-year, posting a loss of 0.7%. The only company in positive territory for the last 12 months was Amdocs, which gained 8.4%. All of the other companies in the sub sector suffered double digit losses over this time frame. Sub sector multiples also fell and closed out the period at 2.2x revenue and 10.8x EBITDA. Both of these compare unfavorably to year-ago multiples of 2.4x revenue and 12.0x EBITDA.

IP Networking

After a strong performance in our spring report, the IP Networking sub sector took a nose-dive in the summer reporting period and dropped 38.9%. This made it the worst performing sub sector in the CFTTI this period. Audiocodes suffered the steepest loss as it shed nearly half of its value, but the other two companies in the sub sector also suffered double digit declines. IP Networking was also the CFTTI's worst performing sub sector for the 12-month period with a loss of 41.5%. Despite these losses, multiple performance was actually mixed. While the sub sector revenue multiple declined steeply from 1.2x a year ago to 0.8x currently, the EBITDA multiple actually increased from 10.1x to 11.3x over the same time period.

Wireline Access and Transport

The Wireline Access and Transport sub sector was yet another sub sector that got punished by the market with a three-month decline of 8.9%. Only two of the eight companies in the index managed a positive return. ADTRAN and Dasan Zhone Solutions fared the worst, as each of these companies fell more than 40%. Even after this period's losses, the sub sector is still close to break even for the full year period with a loss of only 0.6%. Over this time period, ADVA, Calix and Tejas Networks all enjoyed strong gains. Of the remaining five companies in the sub sector, four had double digit losses. This was another sector where multiple performance was better than stock price performance. The sub sector revenue multiple held steady at 1.8x, while the EBITDA multiple increased from 14.7x a year ago to 19.8x currently.

Cable and Video

At first glance, the 9.2% gain in the Cable and Video sub sector this period would make it appear that all is well in this area of the CFTTI. However, despite the fact that it was the best performing sub sector in the CFTTI this period, the gain was all tied to increases at a single company (Harmonic) that was up 33.5%. At the same time, two other companies in the sub sector (Aferian and Casa Systems) declined more than 70%. The picture is very similar for the full year period. Harmonic was up 82.9% for the year, while all of the other companies in the sub sector shed 40% or more of their value. Sub sector multiples are also up sharply compared to last year and closed out the period at 2.2x revenue (compared to 1.7x last year) and 64.5x EBITDA (compared to 33.0x last year).

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Broadband Wireless

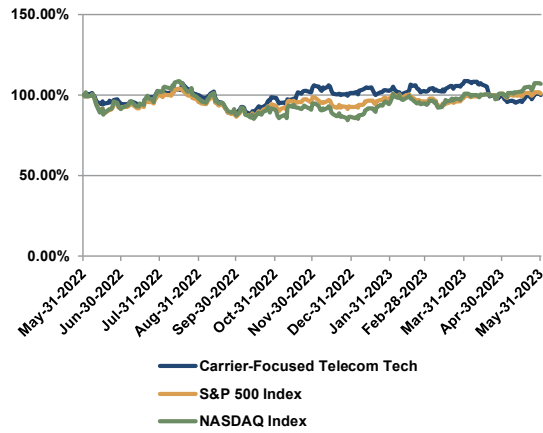
The 38.0% drop in the Broadband Wireless sub sector over the past three months meant that it missed being the worst performing sub sector in the CFTTI by only the slimmest of margins. Every single stock in the index was in negative territory, with Airspan Networks, Cambium Networks and Ubiquiti Networks posting the steepest losses. The sub sector is also the second worst performing sub sector for the full year period with a drop of 36.1%. Multiples also declined sharply, with the sub sector revenue multiple declining from 6.3x to 4.0x over the past year and the EBITDA multiple falling from 30.8x to 20.6x.

Test and Measurement

The Test and Measurement sub sector had another rough go of it with a 10.2% drop in the past three months. All three stocks in the index suffered declines. The sub sector is also down 27.7% over the past 12-months, with once again all of the stocks in the index trading in negative territory. Sub sector multiples at the end of the period stood at 1.7x revenue and 9.2x EBITDA. Both of these are lower than year-ago multiples of 2.3x revenue and 10.8x EBITDA.

Carrier-Focused Telecom Technology: Public Market Summary

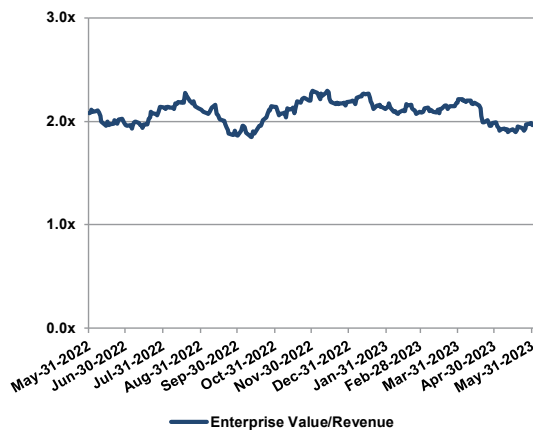
Twelve Month Index Returns



Sector and Sub Sector Returns

	12 Month	3 Month
Carrier-Focused Telecom Tech	0.3%	-2.2%
Large Cap	3.5%	0.6%
OSS/BSS	-0.7%	0.8%
IP Networking	-41.5%	-38.9%
Wireline Access and Transport	-0.6%	-8.9%
Cable and Video	23.3%	9.2%
Broadband Wireless	-36.1%	-38.0%
Test and Measurement	-27.7%	-10.2%
S&P 500	1.2%	5.3%
NASDAQ	7.1%	12.9%

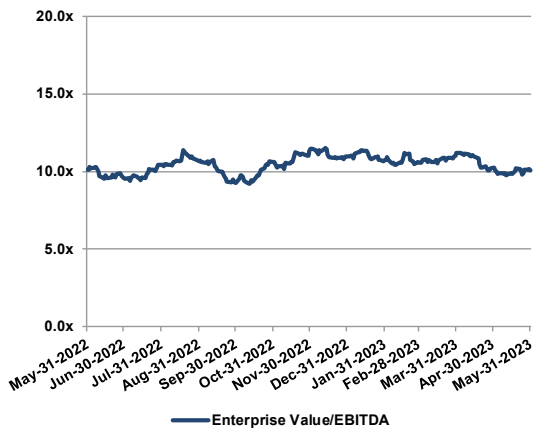
Revenue Multiple Trends



Sector and Sub Sector Revenue Multiples

	5/31/2023	5/31/2022
Carrier-Focused Telecom Tech	2.0x	2.1x
Large Cap	1.9x	2.0x
OSS/BSS	2.2x	2.4x
IP Networking	0.8x	1.2x
Wireline Access and Transport	1.8x	1.8x
Cable and Video	2.2x	1.7x
Broadband Wireless	4.0x	6.3x
Test and Measurement	1.7x	2.3x

EBITDA Multiple Trends



Sector and Sub Sector EBITDA Multiples

	5/31/2023	5/31/2022
Carrier-Focused Telecom Tech	10.1x	10.1x
Large Cap	9.5x	9.4x
OSS/BSS	10.8x	12.0x
IP Networking	11.3x	10.1x
Wireline Access and Transport	19.8x	14.7x
Cable and Video	64.5x	33.0x
Broadband Wireless	20.6x	30.8x
Test and Measurement	9.2x	10.8x

Source: Capital IQ

M&A Summary Comments

M&A

The number of M&A transactions in the Carrier Focused Telecom Technology sector dropped off again this period with only six transactions in the last three months. On the plus side, the total announced transaction dollar volume of \$220 million was higher than what we have seen on our recent reports. Thus far in 2023 we have tracked a total of 14 M&A transactions with a combined announced transaction dollar volume of \$235 million. Both of these metrics are trending very low by historical standards.

OSS/BSS Software

The OSS/BSS Software sub sector was certainly not immune from the general slowdown in sector M&A activity as it notched only four transactions this period. This did include the period's largest announced dollar volume transaction; the \$90 million acquisition of TEOCO's Service Assurance Business by Amdocs. Connectbase also acquired European quoting and catalog vendor LastMil-eXchange, while ISPN Network Services acquired network performance monitoring company iGlass Networks. Finally, it was interesting to note that TEOCO was also a buyer this period with its acquisition of ray tracing and prediction SaaS company Wavecall.

IP Networking

There were no transactions in the IP Networking sub sector this period.

Wireline Access and Transport

There were no transactions in the Wireline Access and Transport sub sector this period.

Cable and Video

There were no transactions in the Cable and Video sub sector this period.

Broadband Wireless

The Broadband Wireless sub sector had two transactions, both of which were corporate divestitures. In the largest of these, Aviat Networks acquired the wireless transport business from NEC for \$70 million. The second transaction was the \$60 million purchase of Airspan's Mimosa business line by Radisys Corporation.

Test and Measurement

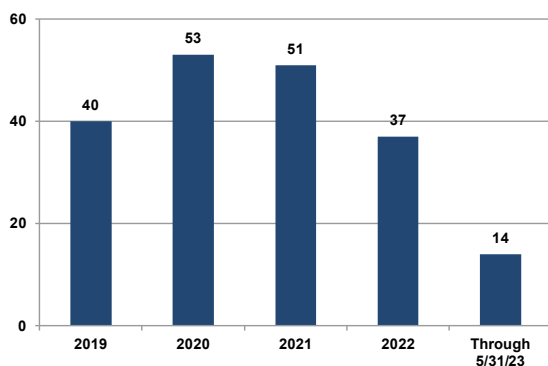
There were no transactions in the Test and Measurement sub sector this period.

Transactions with Multiples

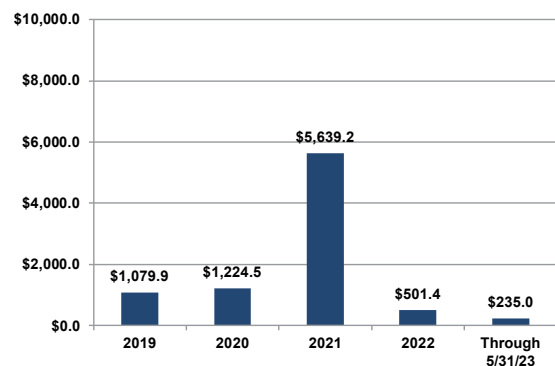
The Aviat Networks acquisition of the NEC wireless transport business had a revenue multiple of 0.5x. There was no announced EBITDA multiple.

Carrier-Focused Telecom Technology: M&A Summary

M&A Activity: Number of Transactions



M&A Activity (\$ Value of Transactions in Millions)



M&A Announced Transactions (3/1/23 – 5/31/23)

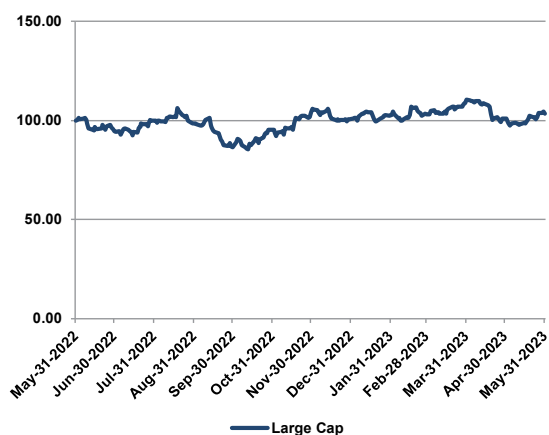
Acquiror	Target	Sector	Date Announced	Purchase Price	Description
Connectbase	LastMileXchange	OSS/BSS Software	5/15/23	NA	Pricing management, quoting, catalog and order management SaaS for businesses in the communications industry.
Amdocs	TEOCO (Service Assurance Business)	OSS/BSS Software	5/10/23	\$90.0	Software with features for fault analytics, operations center management, services prediction and detection and network performance management.
Aviat Networks	NEC (Wireless Transport Business)	Broadband Wireless	5/9/23	\$70.0	Radio communication, transmission and wireless transport systems for businesses in the communication sector.
ISPN Network Services	iGlass Networks	OSS/BSS Software	4/5/23	NA	Software that integrates heterogeneous network performance data into a unified display to provide visibility into broadband connections.
Radisys Corporation	Airspan (Mimosa Networks Business)	Broadband Wireless	3/8/23	\$60.0	Wireless broadband hardware products based on Wi-Fi 5 and Wi-Fi 6E technologies.
TEOCO Corporation	Wavecall	OSS/BSS Software	3/8/23	NA	Telecommunication ray tracing and prediction SaaS for businesses in the telecommunications sector.

M&A Announced Transactions with Revenue Multiples (6/1/22 – 5/31/23)

Acquiror	Target	Sector	Date Announced	Purchase Price	Revenue Multiple	EBITDA Multiple	Description
Aviat Networks	NEC (Wireless Transport Business)	Broadband Wireless	5/9/23	\$70.0	0.5 x	NA	Radio communication, transmission and wireless transport systems for businesses in the communication sector.
Skyvera	Sterlite Technologies (Telecom Software Business)	OSS/BSS Software	1/31/23	\$15.0	0.7 x	NA	Network software, data & analytics and OSS and BSS business software.
IQGeo	COMSOF	OSS/BSS Software	8/11/22	\$13.4	1.8 x	9.8 x	GIS-based network planning and design SaaS with features for fiber optic, heat and smart grid network designing and planning.
Cyient	Celfinet	OSS/BSS Software	6/6/22	\$28.6	1.5 x	NA	5G network planning, performance optimization and management SaaS and network engineering and consulting services.

Sub Sector Analysis: Large Cap

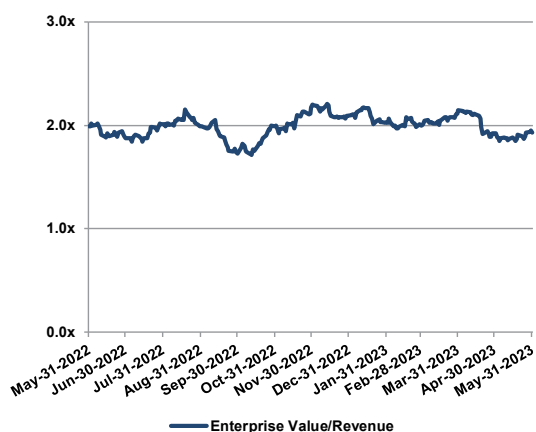
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
Large Cap Index	3.5%	0.6%
Cisco	10.3%	2.6%
Ericsson	-36.1%	-6.2%
Juniper	-1.0%	-1.3%
Nokia	-19.5%	-13.0%
ZTE	35.7%	6.4%

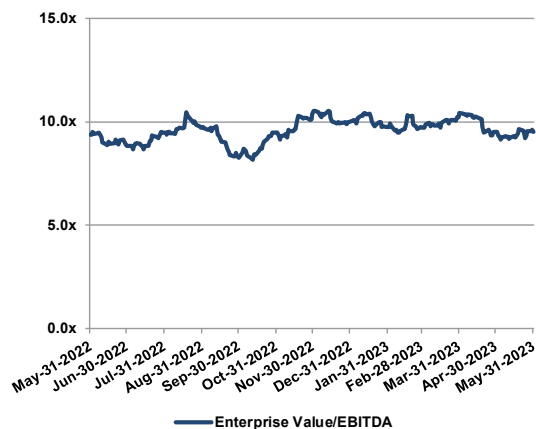
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
Large Cap Index	1.9x	2.0x
Cisco	3.4x	3.4x
Ericsson	0.6x	0.9x
Juniper	1.9x	2.2x
Nokia	0.7x	1.0x
ZTE	1.1x	0.8x

EBITDA Multiple Trends



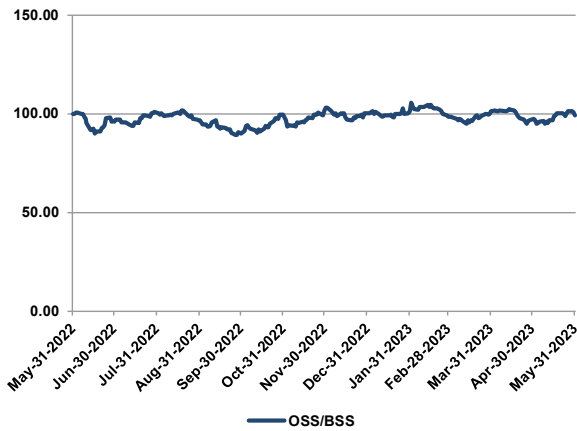
Company EBITDA Multiples

	5/31/2023	5/31/2022
Large Cap Index	9.5x	9.4x
Cisco	11.6x	11.0x
Ericsson	5.1x	5.8x
Juniper	13.1x	15.2x
Nokia	5.2x	7.6x
ZTE	13.5x	7.3x

Source: Capital IQ

Sub Sector Analysis: OSS/BSS Software

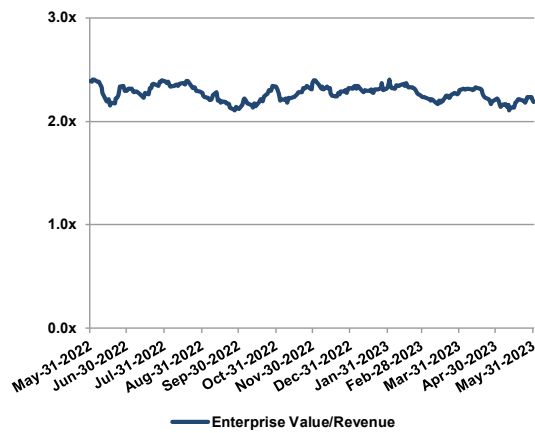
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
OSS/BSS Index	-0.7%	0.8%
Amdocs	8.4%	2.8%
CSG Systems	-22.8%	-14.6%
NetScout	-11.1%	7.3%
Optiva	-62.1%	-44.7%
Radcom	-12.7%	-7.7%
Subex	-10.9%	-4.8%
Synchronoss	-36.8%	-10.3%
Tecnotree	-47.1%	-13.3%

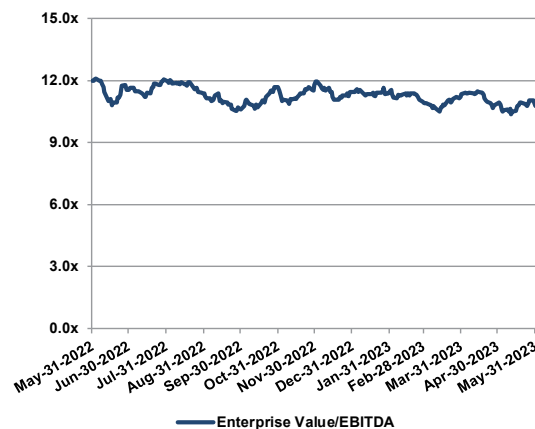
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
OSS/BSS Index	2.2x	2.4x
Amdocs	2.4x	2.4x
CSG Systems	1.6x	2.1x
NetScout Systems	2.1x	2.6x
Optiva	2.1x	2.8x
Radcom	1.4x	2.1x
Subex	5.0x	4.2x
Synchronoss	1.3x	1.3x
Tecnotree	1.7x	3.4x

EBITDA Multiple Trends



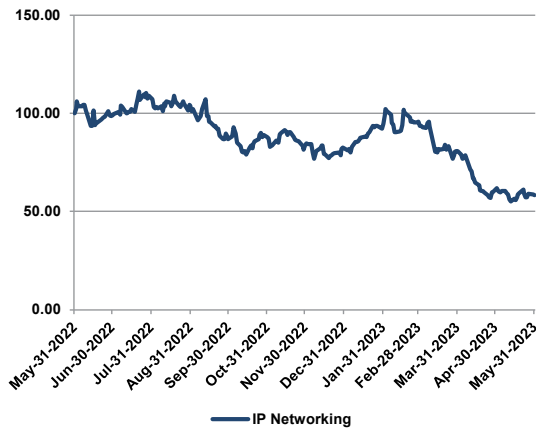
Company EBITDA Multiples

	5/31/2023	5/31/2022
OSS/BSS Index	10.8x	12.0x
Amdocs	12.2x	12.8x
CSG Systems	10.2x	13.7x
NetScout Systems	11.5x	15.5x
Optiva	13.3x	12.8x
Radcom	NM	NM
Subex	NM	48.5x
Synchronoss	23.2x	29.2x
Tecnotree	6.0x	9.7x

Source: Capital IQ

Sub Sector Analysis: IP Networking

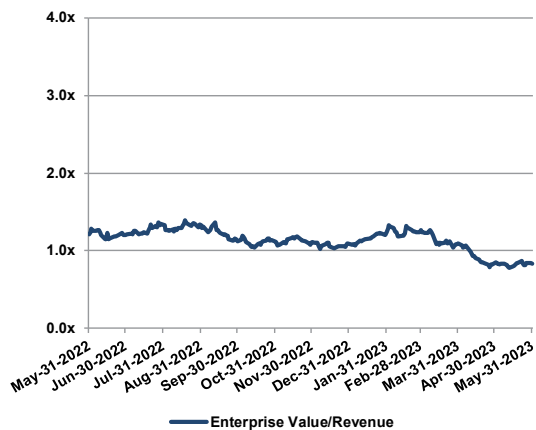
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
IP Networking Index	-41.5%	-38.9%
Allot Communications	-48.5%	-10.0%
Audiocodes	-62.7%	-46.9%
Ribbon Communications	-1.8%	-37.7%

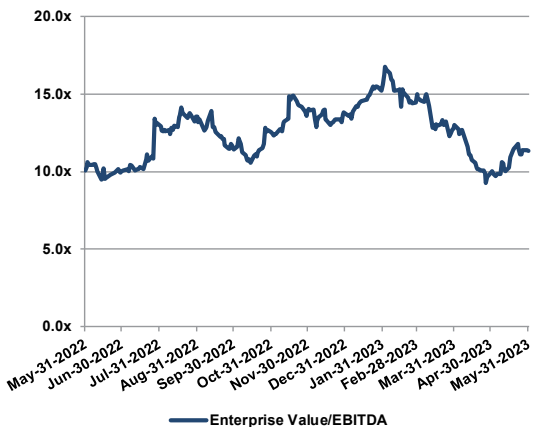
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
IP Networking Index	0.8x	1.2x
Allot Communications	0.6x	0.8x
Audiocodes	0.6x	2.4x
Ribbon Communications	0.9x	0.9x

EBITDA Multiple Trends



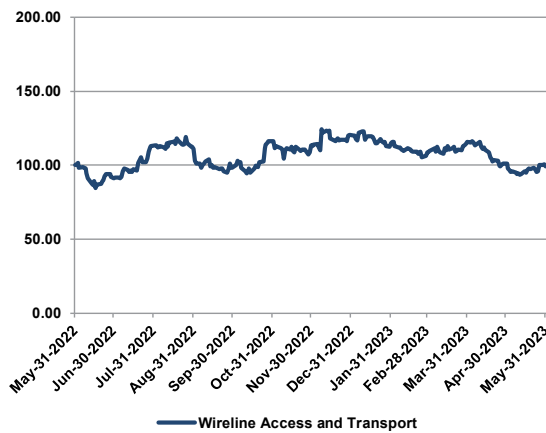
Company EBITDA Multiples

	5/31/2023	5/31/2022
IP Networking Index	11.3x	10.1x
Allot Communications	NM	NM
Audiocodes	6.4x	15.5x
Ribbon Communications	15.6x	10.2x

Source: Capital IQ

Sub Sector Analysis: Wireline Access and Transport

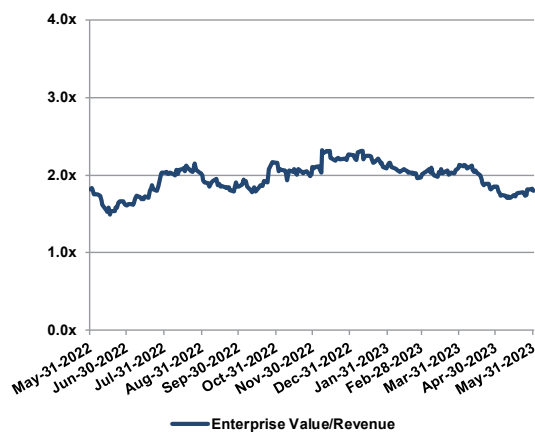
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
Wireline Access & Transport Index	-0.6%	-8.9%
ADTRAN	-51.9%	-48.9%
ADVA	23.0%	-15.5%
BATM	-44.1%	0.5%
Calix	26.2%	-8.9%
CIENA	-8.0%	-3.1%
Dasan Zhone Solutions	-65.8%	-43.5%
Infinera	-14.5%	-30.7%
Tejas Networks	52.7%	24.6%

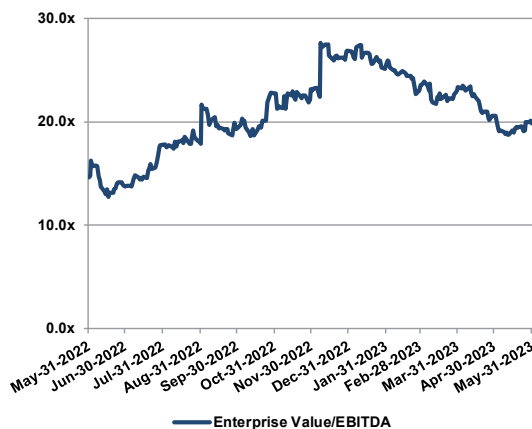
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
Wireline Access & Transport Index	1.8x	1.8x
ADTRAN	1.0x	1.4x
ADVA	1.4x	1.2x
BATM	0.8x	1.3x
Calix	3.0x	3.1x
CIENA	1.8x	1.9x
DASAN Zhone Solutions	0.5x	1.3x
Infinera	1.0x	1.2x
Tejas Networks	11.4x	9.6x

EBITDA Multiple Trends



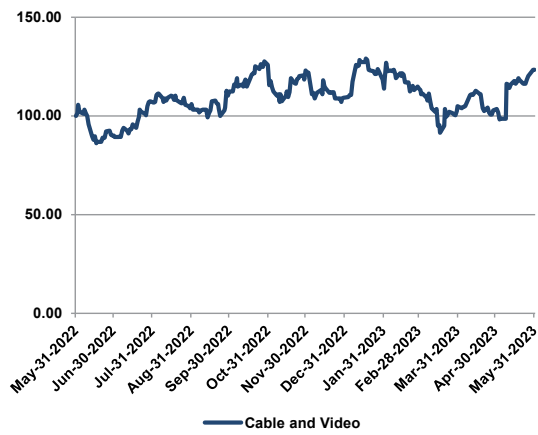
Company EBITDA Multiples

	5/31/2023	5/31/2022
Wireline Access & Transport Index	19.8x	14.7x
ADTRAN	NM	NM
ADVA	16.4x	12.2x
BATM	33.5x	40.5x
Calix	42.6x	28.4x
CIENA	15.9x	12.6x
DASAN Zhone Solutions	NM	NM
Infinera	32.9x	NM
Tejas Networks	NM	NM

Source: Capital IQ

Sub Sector Analysis: Cable and Video

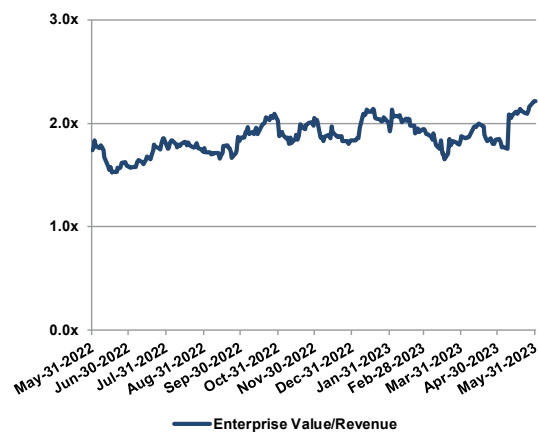
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
Cable and Video Index	23.3%	9.2%
Aferian	-87.3%	-79.3%
Casa Systems	-76.1%	-71.0%
Harmonic	82.9%	33.5%
SeaChange	-45.6%	-0.9%

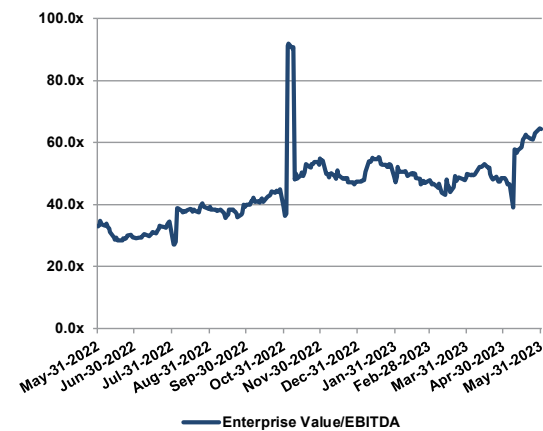
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
Cable and Video Index	2.2x	1.7x
Aferian	0.2x	1.5x
Casa Systems	0.8x	1.4x
Harmonic	3.2x	2.0x
SeaChange	0.2x	0.8x

EBITDA Multiple Trends



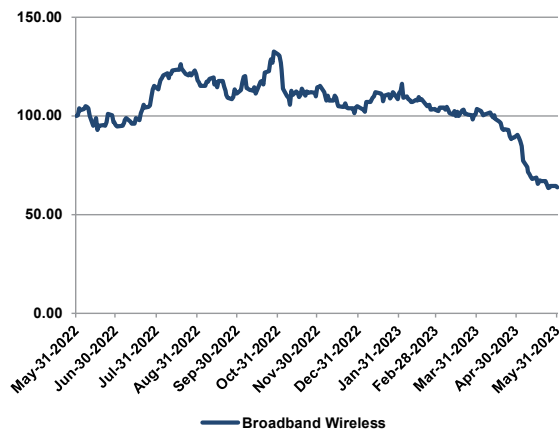
Company EBITDA Multiples

	5/31/2023	5/31/2022
Cable and Video Index	64.5x	33.0x
Aferian	3.3x	19.2x
Casa Systems	NM	1123.8x
Harmonic	29.4x	28.0x
SeaChange	NM	NM

Source: Capital IQ

Sub Sector Analysis: Broadband Wireless

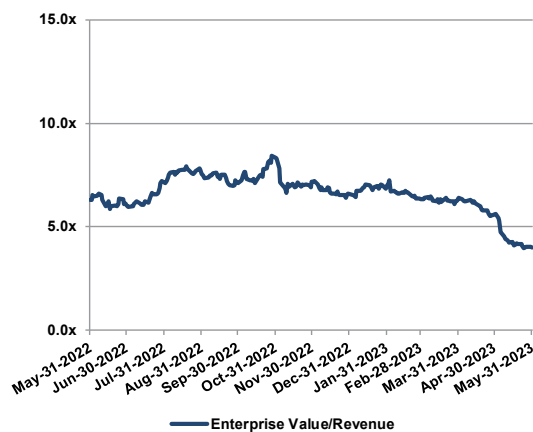
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
Broadband Wireless Index	-36.1%	-38.0%
Airspan Networks	-92.5%	-81.3%
Aviat Networks	4.4%	-13.8%
Cambium Networks	9.7%	-21.9%
Ceragon Networks	1.1%	-3.2%
Ubiquiti Networks	-37.6%	-39.2%

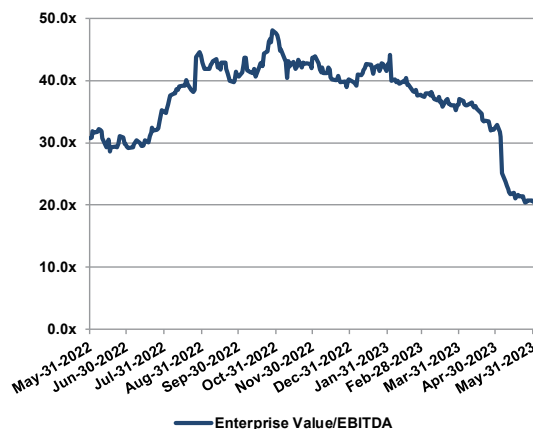
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
Broadband Wireless Index	4.0x	6.3x
Airspan Networks	1.0x	1.9x
Aviat Networks	1.0x	1.0x
Cambium Networks	1.4x	1.2x
Ceragon Networks	0.6x	0.6x
Ubiquiti Networks	5.7x	9.5x

EBITDA Multiple Trends



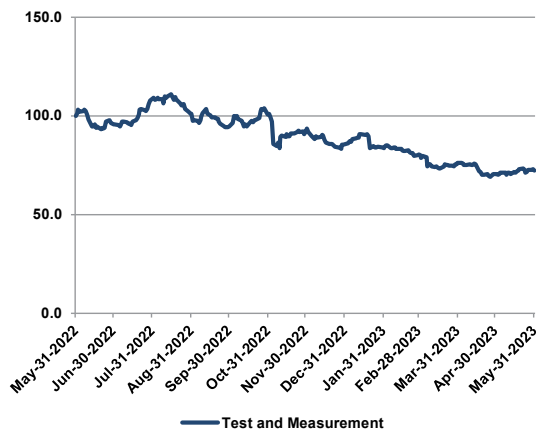
Company EBITDA Multiples

	5/31/2023	5/31/2022
Broadband Wireless Index	20.6x	30.8x
Airspan Networks	NM	NM
Aviat Networks	9.8x	9.1x
Cambium Networks	12.6x	14.5x
Ceragon Networks	19.3x	11.5x
Ubiquiti Networks	20.5x	30.1x

Source: Capital IQ

Sub Sector Analysis: Test and Measurement

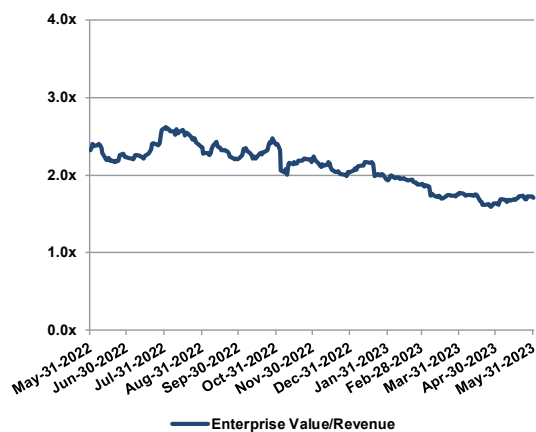
Twelve Month Index Returns



Company Returns

	12 Month	3 Month
Test and Measurement Index	-27.7%	-10.2%
Anritsu	-22.8%	-5.9%
Spirent	-23.9%	-13.8%
Viavi	-32.0%	-10.1%

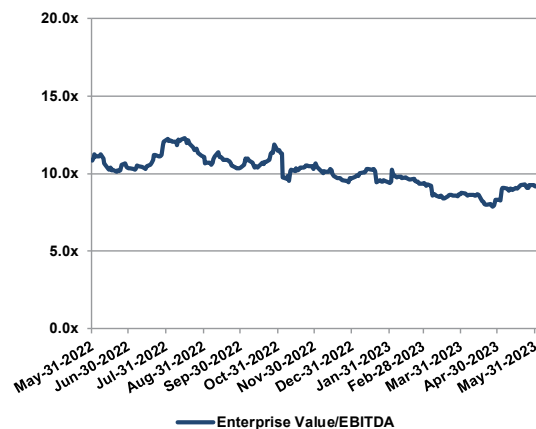
Revenue Multiple Trends



Company Revenue Multiples

	5/31/2023	5/31/2022
Test and Measurement Index	1.7x	2.3x
Anritsu	1.1x	1.4x
Spirent	1.8x	2.8x
Viavi	2.1x	2.7x

EBITDA Multiple Trends



Company EBITDA Multiples

	5/31/2023	5/31/2022
Test and Measurement Index	9.2x	10.8x
Anritsu	6.9x	6.5x
Spirent	8.4x	12.8x
Viavi	12.1x	13.7x

Source: Capital IQ

FOCUS Telecom Technology and Services Team



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Rich Pierce has 20 years of investment banking experience advising middle market clients on a variety of mergers and acquisitions and capital raising transactions. During that time, Mr. Pierce's primary emphasis has been on serving clients in the telecommunications industry including providers of network related hardware and software products, wireless and wireline telecommunications service providers and network engineering and construction companies.



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