Voyant Americas

Comprehensive Analysis

Harmonic Inc. (HLIT – $14.27)

March 30, 2023*

Harmonic Inc. (HLIT) provides video delivery software, products, and system solutions, as well as broadband solutions enabling the deployment of high speed internet. The Company's Video business sells products, software licenses, and SaaS subscriptions to broadband operators, telecommunication service providers, and broadcast and media companies. The Company's Broadband business sells broadband access products, including its CableOS software, and related services to global broadband operators. The Company utilizes third-party contract manufacturers for assembly of its products. Harmonic was founded in 1988 and is headquartered in San Jose, CA. Its fiscal year ends 12/31.

Thesis Summary

We are concerned material and increasing customer concentration with Comcast suggests revenue sustainability risk may be elevated. Our concerns are heightened given (1) uncertainty surrounding an impending Comcast agreement renewal, (2) warrant vesting may have provided Comcast certain incentive to complete the initial agreement, and (3) Comcast may have and continue to pull forward orders prior to incentives expiring. In addition, we believe depressed Broadband (excluding Comcast) revenue suggests other Tier 1 customer deployments may be less lucrative/longer-term initiatives and significant growth from other Tier 1 customers may prove challenging. In our view, a recently announced partnership with Charter may provide limited near-term revenue growth given (1) an uncertain project timeline/scope, (2) network complexity, (3) network transformations are long-term in nature, and (4) Charter selected another vendor for its DAA hardware needs. In our view, Harmonic's market leading position in vCMTS may be pressured given evidence of established competitors entering the virtual broadband access market. In addition, we believe Harmonic DAA market share may decline to expected levels given recent evidence of broadband operators selecting competitor devices for DAA buildouts. We believe Harmonic's Video segment transformation and long-term guidance may be difficult to achieve given a highly competitive and costly video streaming landscape. We are concerned inventory/finished goods may be overbuilt relative to demand and margins may be pressured. Our earnings sustainability concerns are heightened given (1) elevated receivable levels may highlight a channel fill, (2) cash flow deterioration, (3) insider selling, (4) a recent CFO departure, and (5) evidence of shareholder dilution.

Company Data

Country/Exchange	US/NASDAQ
Shares Outstanding (mil)	109.9
Float (mil)	107.3
Short Interest (mil)	8.8
% of Float Short	8.2%
Average Volume (mil)	$18.8
52 Week Range	$8.25 – $15.80
Dividend Yield	0.0%
Market Cap (bil)	$1.6
Net Debt (bil)	$0.0
Enterprise Value (bil)	$1.6
FY 22 Rev (mil)/Rev Growth	$625.0 / 23.2%
FY 22 Adj. EBITDA (mil)	$86.5
FY 22 GM %/Change	51.0% / (80 bps)
FY 22 Adj. EBITDA Margin %/Chg	13.8% / 250 bps

Valuation (as of report date)

NTM P/S	2.2x
NTM EV/ EBITDA	14.9x
NTM P/E	21.4x

Consensus Estimate Drift

	EST	1M Ago	6M Ago	1YR Ago
Q1 23 Rev	$157.8	$157.8	$159.5	$145.0
FY 23 Rev	$721.8	$721.8	$715.8	$669.0
FY 24 Rev	$858.9	$858.9	--	--
Q1 23 EPS	$0.09	$0.09	$0.10	$0.08
FY 23 EPS	$0.67	$0.67	$0.66	$0.58
FY 24 EPS	$0.98	$0.98	--	--

Peers Mentioned In This Report

- Casa Systems Inc. (CASA)
- Charter Communications, Inc. (CHTR)
- Comcast Corporation (CMCSA)
- CommScope Holding Co., Inc. (COMM)
- Vecima Networks Inc. (VCM)

Catalysts and Timing

- Comcast revenue growth slows materially
- Limited non-Comcast broadband customer growth
- Overbuilt inventory drives margin pressure
- Weaker than expected Video SaaS growth

* **All research is completed as of 4:00PM – 4:15PM Eastern Time unless otherwise noted.**
Please refer to the end of this report for an updated version of *The Short List*.

15373 Innovation Drive, Suite 365 San Diego, CA 92128 Tel: (858) 793-2420 Fax: (858) 793-1065

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Company Background

Company description: Harmonic Inc. (HLIT) provides video delivery software, products, and system solutions, as well as broadband solutions enabling the deployment of high speed internet. The Company's Video business sells products, software licenses, and SaaS subscriptions to broadband operators, telecommunication service providers, and broadcast and media companies. The Company's Broadband business sells broadband access products, including its CableOS software, and related services to global broadband operators. The Company utilizes third-party contract manufacturers for assembly of its products. Harmonic was founded in 1988 and is headquartered in San Jose, CA. Its fiscal year ends 12/31.

Revenue by category: In FY 22, appliance and integration accounted for 75.8% of revenue, while software-as-a-service (SaaS) and service accounted for 24.2%. The appliance and integration category includes hardware, licenses, and professional services and represents a non-recurring revenue stream. The SaaS and service category includes SaaS platform usage fees and service support revenue from appliance-based customers and represents a recurring revenue stream.

Revenue By Category Analysis (as % of revenue)	FY 22
Appliance and integration	75.8%
SaaS and service	24.2%
Total	100.0%

Results by segment: In FY 22, the Broadband (Video) segment accounted for 56.1% (43.9%) of segment revenue. Further, Broadband accounted for 48.0% (70.1%) of segment gross profit (segment operating income) and Video accounted for 52.0% (29.9%).

- **Broadband segment:** The Broadband segment provides broadband access solutions, including CableOS software, and relevant services to global broadband companies. CableOS is a software-based broadband access solution consisting of virtualized cloud-native software that connects with a variety of Harmonic and third-party hardware devices. In addition, the Broadband segment offers CableOS Central Cloud Services, a value-add subscription services for CableOS customers that bundles (1) 24x7 technical support, (2) a dedicated customer success team, and (3) a CableOS Central Suite SaaS.

- **Video segment:** The Video segment provides video processing, production, and playout solutions and services through Harmonic products, licenses, and SaaS subscriptions. The Video segment offers software-based video processing appliances which include network management and application software and hardware products that provide customers the ability to acquire a variety of signals from different sources and in different protocols in order to deliver real-time and stored content to their subscribers. Video segment product families include encoders, video services, high-density stream processing, and edge processors. In addition, the Video segment offers SaaS platforms that provide streaming and channel origination and distribution services in a public cloud environment.

FY 22 Segment Analysis (as % of total)	Revenue	Gross Profit	Operating Income
Broadband	56.1%	48.0%	70.1%
Video	43.9%	52.0%	29.9%
Total	100.0%	100.0%	100.0%

Background on CableOS and vCMTS: CableOS is a software-based broadband access solution deployed on commercial servers or as a cloud-native application. The virtualized CableOS solution connects with various Harmonic and third-party indoor and outdoor hardware (e.g. indoor shelves, outdoor nodes, remote MAC/PHY devices, etc.) in a centralized, distributed access (discussed below), or hybrid architecture. Based on our understanding of the business, the CableOS solution is primarily deployed as a virtualized cable modem termination system (vCMTS) supporting DOCSIS and FTTH (fiber to the home) functionality.

Background on distributed access architecture: Distributed access architecture (DAA) enables functions typically occurring in the headend to be distributed closer to users through edge devices, such as shelves, nodes, and remote PHY devices. In its FY 22 10K, Harmonic represented interest in distributed access solutions continued to accelerate. In addition, the Company highlighted distributing DAA nodes near end users relieved power and space requirements at headend sites, reducing costs and improving operational efficiency. Based on our understanding of the business, its advantageous to pair vCMTS with DAA.

Background on customers: In its FY 22 10K, Harmonic disclosed it sold products to various cable, satellite, telecommunications, broadcast, and media companies. In addition, Harmonic identified certain companies (listed below) as "significant" end user and integrator/reseller customers.

US Customer Analysis	International Customer Analysis
AT&T	America Movil
Charter Communications	Groupe Canal
Comcast	IISN Systems
Cox Communications	Millicom
Deltatre	Netorium
Heartland Video Systems	NYL Electronica
Intelsat	Rogers Communications
Mega Hertz	Tele2 Sverige AB
SES	Vodafone

Background on major customers: In its FY 22 10K, Harmonic disclosed Comcast Corporation (CMCSA) accounted for 39.0% of revenue. No other customer accounted for more than 10.0% of FY 22 revenue, however, Intelsat S.A. (private), SES S.A. (SESFd.PA), and Vodafone Group PLC (VOD.L) have, in certain periods, accounted for greater than 10.0% of revenue. In addition, Harmonic disclosed sales to its ten largest customers accounted for 67.0% of revenue.

Major Customer Analysis (as % of revenue)	FY 22
Comcast	39.0%
Next nine largest	28.0%
Top ten customers	67.0%
Other	33.0%
Total	100.0%

Revenue by geography: In FY 22, Americas accounted for 72.5% of revenue, Europe, Middle East, and Africa (EMEA) accounted for 21.3%, and Asia Pacific accounted for 6.2%.

Geography Analysis (as % of revenue)	FY 22
Americas	72.5%
EMEA	21.3%
Asia Pacific	6.2%
Total	100.0%

Competition: In its FY 22 10K, Harmonic highlighted its Broadband business competed with network solution and communications equipment suppliers. Competitors in the broadband access solutions market include Casa, Ciena, Cisco, and CommScope, among others.[1] In addition, Harmonic represented its Video appliance business competed with video delivery/processing providers, compression products/solutions, broadcast equipment and solution providers, and certain network infrastructure companies. Its Video SaaS business competed with video delivery/processing SaaS solution companies, SaaS video streaming platforms, and certain public cloud service providers. Further, Harmonic indicated video industry consolidation led to the acquisition of historic competitors by private equity firms and Amazon Web Services (AWS).

[1] Casa Systems, Inc. (CASA), Ciena Corporation (CIEN), Cisco Systems, Inc. (CSCO), CommScope Holding Co., Inc. (COMM).

Voyant's Earnings Risk Assessment

We are concerned material and increasing customer concentration with Comcast suggests revenue sustainability risk may be elevated. Our concerns are heightened given (1) uncertainty surrounding an impending Comcast agreement renewal, (2) warrant vesting may have provided Comcast certain incentive to complete the initial agreement, and (3) Comcast may have and continue to pull forward orders prior to incentives expiring. In addition, we believe depressed Broadband (excluding Comcast) revenue suggests other Tier 1 customer deployments may be less lucrative/longer-term initiatives and significant growth from other Tier 1 customers may prove challenging. In our view, a recently announced partnership with Charter may provide limited near-term revenue growth given (1) an uncertain project timeline/scope, (2) network complexity, (3) network transformations are long-term in nature, and (4) Charter selected another vendor for its DAA hardware needs. In our view, Harmonic's market leading position in vCMTS may be pressured given evidence of established competitors entering the virtual broadband access market. In addition, we believe Harmonic DAA market share may decline to expected levels given recent evidence of broadband operators selecting competitor devices for DAA buildouts. We believe Harmonic's Video segment transformation and long-term guidance may be difficult to achieve given a highly competitive and costly video streaming landscape. We are concerned inventory/finished goods may be overbuilt relative to demand and margins may be pressured. Our earnings sustainability concerns are heightened given (1) elevated receivable levels may highlight a channel fill, (2) cash flow deterioration, (3) insider selling, (4) a recent CFO departure, and (5) evidence of shareholder dilution.

Comcast Driven Growth May Be Unsustainable Amid Upcoming Agreement Renewal

Background on Comcast enterprise license pricing agreement: In its 07/09/19 Press Release, Harmonic announced Comcast elected enterprise license pricing for Harmonic's CableOS broadband access solution software. The election was effective 07/01/19 and Comcast committed to pay $175.0 million in software license fees over the four year enterprise license term. In addition, Comcast may earn certain "incentive credits" contingent upon purchases of "other" CableOS-related products.

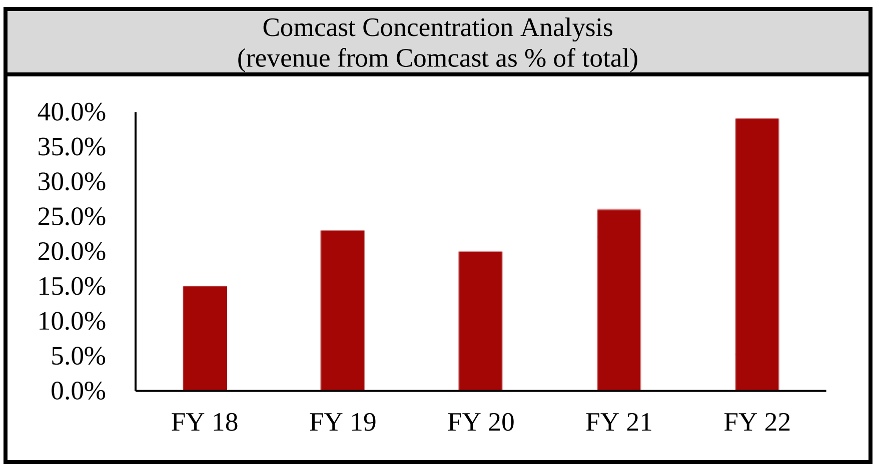
> In connection with the Election, which is effective as of July 1, 2019 (the "**Effective Date**"), CCCM committed to $175 million in software license fees over the four year term of the enterprise license, subject to certain incentive credits that may be earned by CCCM pursuant to other purchases of CableOS-related products. CCCM will pay the initial $50 million of the enterprise license fees in 2019. (HLIT Press Release, 07/09/19)

Enterprise license agreement election drove full vesting of Comcast warrants: In its 07/09/19 Press Release, Harmonic highlighted previously, on 09/26/16, it issued Comcast a warrant for the right to purchase up to 7,816,162 shares of common stock. The warrant shares had an exercise price of $4.76 with vesting pursuant to Comcast's completion of certain milestones and thresholds. Prior to the software licensing agreement, Comcast had vested 1,954,042 warrant shares for certain milestone achievements. In connection with the software license agreement, Harmonic deemed all remaining milestones and thresholds required to fulfill each of the vesting requirements were satisfied and/or otherwise waived and all warrant shares were fully vested and exercisable as of 07/01/19.

> Prior to the Effective Date, Comcast had already vested in 1,954,042 Warrant Shares as a result of the achievement of certain milestones. In consideration for the Election commitments and certain other purchase commitments, the Company deemed that all of the remaining milestones and thresholds required to fulfill each of the vesting requirements of the Warrant were satisfied and achieved or otherwise waived such that all Warrant Shares were fully vested and exercisable as of the Effective Date. (HLIT Press Release, 07/09/19)

Significant and increased customer concentration may highlight revenue sustainability risk, in our view: In FY 22, revenue derived from Comcast (as a percent of total revenue) increased 84.8% (1,300 basis points) year-over-year to $243.7 million (39.0%), <u>the highest level in at least five years</u>. On its Q4 22 Conference Call, Harmonic did <u>not</u> comment on the Comcast deployment status <u>nor</u> specifics concerning the future of its relationship with Comcast. Harmonic highlighted it was "a strong quarter" from Comcast, it continued to have "quite a bit of runway" with Comcast, and its approach to the relationship was to "be a long-term partner." We believe high and increased customer concentration highlights increased dependence on one customer and increased revenue sustainability risk. Our concerns are heightened given uncertainty regarding Comcast deployment levels and the nature of the Harmonic/Comcast relationship going forward (discussed below).

> **Analyst:** I have a question on really Comcast in particular, quite an uptick there in the quarter. And I guess I want to get your perspectives along several lines on that, which is for that specifically, would you characterize that as sort of a year-end spending thing because you've been kind of stair stepping up here, I guess the overall question I'm getting to is that are we at or near peak Comcast contribution on a quarterly type basis. So how would you describe that? And where would you put them in terms of their overall deployment of the kind of next-gen Remote PHY technology?
>
> **CEO Mr. Patrick Harshman:** They've -- I think, been as explicit as they want to be in their recent public statements about their intentions in this area, I would say that there's always some variability quarter-to-quarter. It was a strong quarter. But we -- look, we said that there -- excuse me, our total business is 15 million modems passed, and that's across what is now 90-plus customers. So Comcast is certainly the biggest piece of that, but by no means the whole piece of that. So you can do some very rough math looking and saying that even within Comcast, we're -- we still have quite a bit of runway ahead of us, I think, in any scenario in which they go forward. And our approach to the relationship is to be a long-term partner as they continue to evolve and develop the network. (Q4 22 Conference Call, 01/30/23)



<u>We have the following observations about the Comcast enterprise license pricing agreement:</u>

1. **Licensing agreement expiration amid uncertain renewal terms may highlight revenue risk, in our view:** As mentioned, the Comcast agreement had a four year term (i.e. set to expire on 06/30/23). Based on our understanding of representations made to us by the Company, the licensing agreement has the potential to be renewed and Harmonic's FY 23 guidance assumed the agreement will be renewed.[2] While we acknowledge an agreement renewal may be likely, we believe uncertainty regarding the renewal status and terms may highlight potential revenue risk and/or the renewal terms may be less favorable to Harmonic given an incentive laden initial agreement (discussed next) and increased Comcast importance to Harmonic revenue.

2. **Warrant vesting may have provided Comcast initial licensing agreement incentive, in our view:** As mentioned, certain Comcast warrants to purchase Harmonic shares vested pursuant to the enterprise licensing agreement. In its FY 21 10K, Harmonic disclosed the fair value of the vested warrant attached to the CableOS software license agreement was approximately $16.1 million per the Black-Scholes options pricing model. While we acknowledge Comcast may have retained certain ownership of Harmonic (on 12/17/19 Comcast

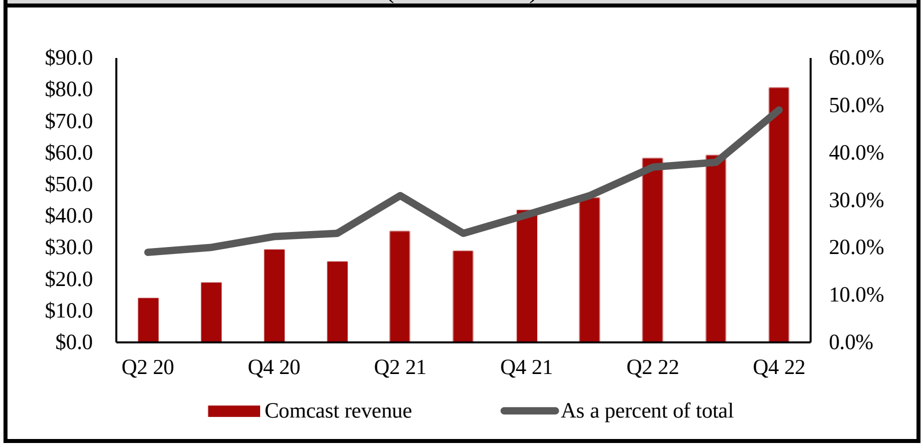
[2] Throughout the course of our research, we communicated with Harmonic's investor relations department. We appreciate their timely and thorough response to our inquiries.

exercised the warrant in its entirety, receiving 3,217,547 net shares), given Comcast had certain incentive to enter into the initial license agreement (i.e. warrant vesting) and similar incentive may not be present for the renewal, our concerns about potentially unfavorable renewal terms for Harmonic are heightened.

> The fair value of the Warrant that vested in connection with the CableOS software license agreement was estimated to be $16.1 million on July 8, 2019, using the Black-Scholes option pricing model. (FY 21 10K)

3. **Comcast may have and continue to pull forward orders ahead of expiring incentives, in our view:** In Q4 22, revenue from Comcast (as a percent of total) increased 92.0% (2,210 basis points) year-over-year to $80.6 million (49.0%). As mentioned, Comcast was entitled to certain incentive credits per the CableOS software licensing agreement. Specifically, Comcast could earn certain "incentive credits" contingent upon "purchases of CableOS-related products." In our view, Comcast may have and continue to pull forward CableOS-related product purchases prior to the expiration of certain incentive credits on 06/30/23. We are concerned the recent Comcast revenue surge may (1) be unsustainable, (2) create challenging comparable periods, and (3) mask deceleration in Broadband growth (discussed herein). Further, we believe Comcast may accelerate purchases ahead of the agreement renewal to improve its negotiating position (i.e. pull forward purchases to secure product in case renewal negotiation takes longer than expected).

Comcast Revenue Analysis
($ in millions)



Existing Tier 1 Customers Excluding Comcast May Be Less Significant & Slower To Scale

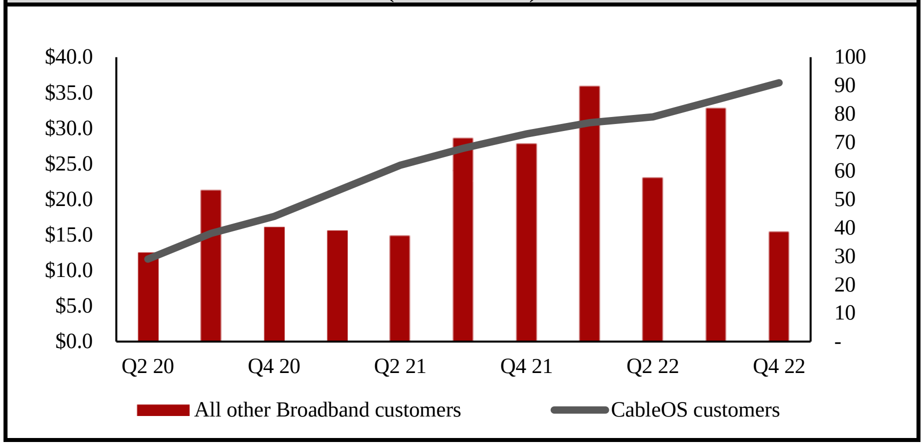
Background on disclosed Tier 1 customers: On its Investor Day Conference Call on 09/15/22, Harmonic highlighted it characterized Tier 1 customers as top ten in major geographies (e.g. North America, Latin America, Europe, Asia Pacific).

Declining Broadband revenue excluding Comcast suggests less lucrative and/or slower initiations: In Q4 22, Broadband revenue increased 37.7% to $96.0 million. However, Broadband revenue excluding Comcast declined 44.4% to $15.4 million. On its Q4 22 Conference Call, the Company highlighted "sustained" Broadband growth driven by a "robust" end market and "strong" go-to-market/project execution. In addition, Harmonic added its first Asia Pacific Tier 1 customer and guided for the project to begin scaling in FY 23, and in Q4 22, customers deploying Harmonic's CableOS platform increased 24.7% year-over-year to 91. **While we acknowledge Harmonic has steadily grown its Broadband customer base and total Broadband revenue increased in recent periods, we are concerned (1) Broadband revenue growth was driven entirely by Comcast and (2) Broadband revenue excluding Comcast declined materially (in our view) despite a growing customer base. Accordingly, we are concerned other Broadband customers may provide limited growth opportunities and our concerns about Harmonic's dependence on Comcast are heightened.**

> Our sustained broadband growth is a result of both the robust end market and strong go-to-market and project execution. The quarter end modem served grew to 15.2 million, up 218% year-over-year. And we

again added several new customers during the quarter, bringing the number deploying our solution to 91, up 25% year-over-year. Among these new wins is our first Asia Pacific Tier 1 operator in an account we expect to begin to scale in 2023. (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23)

Broadband Revenue Excluding Comcast Analysis
($ in millions)



Certain existing Tier 1 customer deployments may be longer-term initiatives, in our view: On its Q4 22 Conference Call, Harmonic disclosed it had eleven Tier 1 customers (including Comcast). Harmonic highlighted Comcast was "aggressive" and "by far the furthest along," while seven other Tier 1 customers were advancing, however, not at the pace of Comcast. In addition, the other four Tier 1 customers were "just getting going" and not materially impactful. While we acknowledge Tier 1 deployments may accelerate in future periods, we are concerned certain Tier 1 customers may integrate Harmonic software and hardware at significantly slower rates (relative to Comcast) and/or on a smaller scale (discussed next). Therefore, we are concerned potentially slowing Comcast growth (discussed above) coupled with slower/smaller Tier 1 implementations suggests revenue growth may be pressured.

And of those, about 7, Steve, I would say, are really in the process of rolling. **None of them is as far along and has the pace with Comcast to date**. And we see them all of those accelerating toward that. And indeed, there's another **4 out of the 11 that are just getting going and haven't really materially impacted things**. So with the -- just the currently on Tier 1s, we see the rest of the pack picking up the pace, of course, proportionate to their size, right? (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23) [emphasis added]

Other existing Tier 1 customer revenue contributions may be less significant than Comcast, in our view: Harmonic disclosed select Tier 1 broadband customers in various Investor Day Presentations. Therefore, we identified certain Tier 1 broadband customers. Specifically, we believe Vodafone, Telefonica, Rogers, Tele 2, and Millicom are Tier 1 customers committed to deploying a version of Harmonic's broadband access solutions.[3] As mentioned, Harmonic defined Tier 1 as being top ten in major geographies. Given a broad criterion for Tier 1 and certain Tier 1 customers have been Harmonic customers for multiple years, we believe existing Tier 1 customers may be smaller scale and/or slower in rolling out Harmonic solutions relative to Comcast. Accordingly, we believe significant growth from existing Tier 1 customers may be difficult.

Recently announced Charter partnership may provide limited near-term revenue ramp, in our view: In its Press Release on 03/20/23, Harmonic announced it was partnering with Charter Communications, Inc. (CHTR) to deploy virtualized CMTS technology (i.e. CableOS solution) for next generation broadband services. In addition, Harmonic guided for Charter to deploy its CableOS Platform across a distributed access architecture for multi-gigabit DOCSIS 3.1 and 4.0 capability. The Press Release did not disclose the scope or timing of deployment. On its Q4 22 Conference Call, Harmonic highlighted network integrations were "inherently complex," especially for

[3] Given Harmonic does not disclose specific terms of Tier 1 customer engagements (with Comcast the exception) it's unclear the extent of each implementation.

large operators, and rollout plans typically covered multiple years. While we acknowledge the opportunity for revenue generation from a large Tier 1 operator similar to Comcast, given (1) no disclosed project timeline or scope, (2) varying network complexities, (3) the long-term initiative of transitioning network software/hardware, and (4) Charter selected a competitor (Vecima) for its distributed access architecture rollout (discussed herein), we believe a significant Charter-driven near-term revenue ramp may be unlikely.

> And while any rollout -- any network rollout is inherently complex and particularly with larger operators, they all have different idiosyncrasies factors to consider. I think our ability to bring our expertise and experience to bear is certainly improving the possible pace of rollout relative to what it was a couple of years. That being said, I mean, I think all the customers we talk to still look at and think about multiyear kind of rollout plans. (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23)

Increased vCMTS & DAA Competition May Drive Market Share & Revenue Pressure

Background on CableOS and vCMTS: CableOS is a software-based broadband access solution deployed on commercial servers or as a cloud-native application. The virtualized CableOS solution connects with various Harmonic and third-party indoor and outdoor hardware (e.g. indoor shelves, outdoor nodes, remote MAC/PHY devices, etc.) in a centralized, distributed access (discussed next), or hybrid architecture. Based on our understanding of the business, the CableOS solution is primarily deployed as a virtualized cable modem termination system (vCMTS) supporting DOCSIS and FTTH (fiber to the home) functionality.

Background on distributed access architecture: Distributed access architecture (DAA) enables functions typically occurring in the headend to be distributed closer to users through edge devices, such as shelves, nodes, and remote PHY devices. In its FY 22 10K, Harmonic represented interest in distributed access solutions continued to accelerate. In addition, the Company highlighted distributing DAA nodes near end users relieved power and space requirements at headend sites, reducing costs and improving operational efficiency. Based on our understanding of the business, its advantageous to pair vCMTS with DAA.

Market leading position may be pressured as established competitors develop virtual access solutions: On its Barclays 2022 Global Technology, Media and Telecommunications Conference Call on 12/08/22, Harmonic highlighted it had 100.0% (70.0%) of the vCMTS (DAA) market. Throughout the course of our research, we identified certain recent competitor commentary highlighting virtual broadband access capabilities. While we acknowledge Harmonic has historically been the market leader in vCMTS solutions, we are concerned increasing competition may pressure Harmonic market share and revenue growth. We included certain competitor virtualization commentary below:

- **CommScope highlighted vCMTS Remote PHY and MACPHY capabilities and competitive advantage:** CommScope Holding Co., Inc. (COMM) provides communication networks with infrastructure solutions including broadband, home, outdoor wireless networks, and venue/campus networks. On its Q3 22 Conference Call on 11/03/22, CommScope highlighted it was "the largest in the game" and its major R&D investment allowed it to support "whatever technologies" selected by customers. In addition, CommScope represented its vCMTS with Remote PHY nodes was sold frequently to "very large" customers. CommScope indicated its "history and installed base" afforded a competitive advantage relative to its peers.

  > Look, as we shared with everyone at SCTE, I mean, **we're the largest in the game** and have **very large investments in R&D, which allow us to support whatever technologies customers choose**. Our E6000 can act as an [indiscernible] actually to drive Remote PHY, if that's what people want to use. **We also have a virtual CMTS with the Remote PHY that works to -- that we sell a lot to very large customers today**. And then we have a remote MACPHY, which Mediacom just chose to do. I know there are still lots of questions on the technology path, but I think **our history and installed base gives us a very strong knowledge position over the competition** as we understand their networks, both the hardware and the software and puts us in a great position to be their partner. (COMM CEO Mr. Charles Treadway, COMM Q3 22 Conference Call, 11/03/22) [emphasis added]

- **Casa highlighted "several" successful vCCAP deployments and was awarded a large cable operator deal:**

Casa Systems, Inc. (CASA) provides digital cable video and broadband solutions, including cable, fixed, mobile, optical, Wi-Fi networks, and its own access devices. In its FY 22 10K, Casa represented its virtual converged cable access platform (vCCAP) and DAA provided gigabit broadband service to customers and was deployed in "over 70" global customer trials.[4] On its Q4 22 Conference Call on 03/14/23, Casa represented it had "several successful" vCCAP Remote PHY Device solutions in production deployments. Further, Casa highlighted it was awarded a "large" vCCAP deal with a "major" European cable operator as one of Casa's competitors "failed to deliver." In addition, Casa indicated it was in consideration for a cable infrastructure upgrade project with a "major" North American cable operator, however, it was not selected.

> As disclosed in our January 31 release, we have several successful virtual CCAP RPD solutions in production deployments today. And during Q4, we were also awarded a large virtual CCAP deal with a major European cable MSO with initial delivery expected later in 2023. And we are focused on providing -- continuing to provide best-in-class solutions to cable MSOs globally, just like we've done for the past 20 years. (CASA CFO Mr. Edward Durkin, CASA Q4 22 Conference Call, 03/14/23)

Harmonic DAA share may decline to expected levels amid increased hardware competition: As mentioned, Harmonic represented it had 70.0% DAA market share. On its Q4 22 Conference Call, Harmonic acknowledged competition in the hardware market and indicated its initial model considered a 30.0% DAA market share. Throughout the course of our research, we identified certain recent competitor commentary highlighting partnerships with major operators to provide DAA hardware. While we acknowledge Harmonic has maintained a higher DAA share than anticipated, we are concerned increasing competition may drive market share losses in line with expectations and revenue may be pressured. Our concerns are heightened given the CableOS solution connects with Harmonic <u>and</u> third-party hardware. We included certain competitor DAA hardware commentary below:

> On the other hand, from the beginning, we've acknowledged and talked about competitors in the hardware arena. You may recall, going back 15 months or so ago, **our initial multiyear model contemplated us only having about 30% of DAA market share**. We raised that somewhat in our more recent September '22 outlook is just reflecting the strong success that we're seeing in the hardware area. But to be clear, we always expected and continue to expect the hardware piece of DAA to be a multi-competitor situation. And really, Tim, that hasn't changed. (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23) [emphasis added]

- **Vecima selected to provide hardware in Charter's 10G network evolution:** Vecima Networks Inc. (VCM) enables broadband and video streaming networks with software, services, and integrated platforms. In its Press Release on 03/21/23, Vecima announced its Entra DAA solution and ERM3 Remote PHY Devices (RPD) were chosen by Charter to support Charter's 10G broadband network evolution. In addition, Vecima represented the ERM3 was likely to be used in a "substantial" portion of Charter's network. Vecima highlighted its RPDs allowed for legacy hybrid fiber coax nodes to be easily upgraded and "dramatically" increased broadband capacity. Further, Vecima represented there was "significant" market adoption of its Entra cable access and fiber access products, specifically Remote PHY nodes and its DAA portfolio experienced record revenue with "strong" deliveries in recent quarters.

> Vecima Networks Inc. (TSX: VCM) today announced that Charter Communications, Inc. has selected its Entra® Distributed Access Architecture (DAA) solution with ERM3 Remote PHY Devices to support its fixed broadband network evolution to 10G. The ERM3 is expected to be used for a substantial portion of Charter's network and to support a growth plan driven by network evolution, expansion, and execution. Vecima's ERM3 Remote PHY Device (RPD) is designed to easily upgrade legacy Hybrid Fiber Coax (HFC) nodes to DAA and reduce time and cost for service providers while dramatically increasing broadband capacity. (VCM Press Release, 03/21/23)

- **CommScope selected to lead Mediacom DAA migration:** In its Press Release on 10/27/22, CommScope announced it was selected by Mediacom Communications Corporation to facilitate Mediacom's DAA network

[4] Casa's vCCAP deploys a cloud-native broadband access solution coupled with DAA utilizing Remote PHY and network edge devices (i.e. similar to Harmonic's vCMTS/DAA) for wireless, <u>cable</u>, and fixed networks. Therefore, we believe Casa's vCCAP competes with Harmonic's vCMTS as an alternative for broadband operators transitioning to virtualized solutions.

migration. In addition, Mediacom will deploy CommScope RD2322 RxDs as Remote MACPHY Devices. Further, CommScope represented the RD2322 RxD had "unsurpassed flexibility" and could operate as a Remote PHY Device or Remote MACPHY Device. In addition, Mediacom highlighted CommScope was a "trusted partner" and its devices would ensure a "smooth and efficient" network transition.

> CommScope is a trusted partner that has successfully powered our groundbreaking 10G Smart Home and subscriber trial with their end-to-end Remote PHY solution over the last couple of years. With the confidence we've gained with CommScope solutions, we're ready to take the next step to Remote MACPHY with the RD2322 RxD to achieve a new level of capacity and latency performance for our subscribers. CommScope's flexible solutions have allowed us to take advantage of our installed base of nodes, as well as the RD2322 RxD's ability to operate as a Remote MACPHY device, to make a smooth and efficient transition to our network of the future. (Mediacom CTO Mr. JR Walden, COMM Press Release, 10/27/22)

- **Casa announced it will showcase next-generation broadband technologies:** In is Press Release on 03/28/22, Casa announced it would showcase next-gen broadband products and solutions at ANGA COM 2023. Casa represented its "versatile" edge devices were driving the future of broadband networks with "innovative" optionality. In addition, Casa highlighted its DAA solutions enabled service providers to expand capacity to the network edge.

> Casa Systems' family of Distributed Access Architecture solutions are designed to help service providers push capacity to the edge; improving the services their subscribers enjoy, extracting more value from existing investments, while maintaining seamless operations in the transition from a centralized to a distributed environment. (CASA Press Release, 03/28/23)

Video Segment Transition To SaaS May Pressure Near-Term Revenue & Prove Difficult

Background on Video segment: In FY 22, the Video segment accounted for 43.9% of revenue and 52.0% (29.9%) of segment gross profit (segment operating income). The Video segment provides video processing, production, and playout solutions and services through Harmonic products, licenses, and SaaS subscriptions. The Video segment offers software-based video processing appliances which include network management and application software and hardware products that provide customers the ability to acquire a variety of signals from different sources and in different protocols in order to deliver real-time and stored content to their subscribers. Video segment product families include encoders, video services, high-density stream processing, and edge processors. In addition, the Video segment offers SaaS platforms that provide streaming and channel origination and distribution services in a public cloud environment.

FY 22 Video Segment Analysis (as % of total)	Revenue	Segment Gross Profit	Segment Operating Income
Video	43.9%	52.0%	29.9%

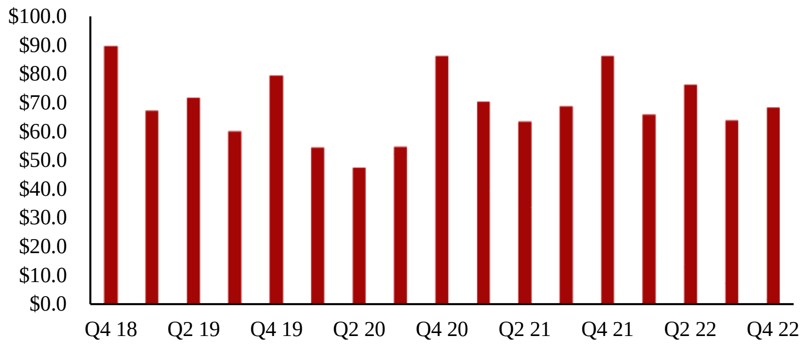
Background on Video segment transition and revenue recognition: In its FY 14 Analyst and Investor Day Presentation on 05/15/14, Harmonic highlighted a "disruptive" transition to software/cloud video delivery (opposed to appliance) employing a new strategic platform, VOS. In its FY 22 10K, Harmonic disclosed its VOS360 SaaS platforms afforded streaming, channel origination, and distribution in a public cloud ecosystem. In addition, Harmonic highlighted its transition from video appliances to a SaaS subscription model may generate near-term revenue pressure given SaaS revenue was recognized over the subscription term relative to service usage. On its Investor Day Conference Call on 09/15/22, Harmonic indicated its first, early adopter cloud SaaS customers were launched in FY 17 and FY 18.

> Our VOS360 SaaS platforms provide both streaming and channel origination and distribution services in a public cloud environment that is fully managed and operated by our 24/7 DevOps teams. Our SaaS solutions enable the packaging and delivery of high-quality streaming services, including live streaming, VOD, catch-up TV, start-over TV, network-DVR and cloud-DVR services through HTTP streaming to any

device, along with dynamic and personal ad insertion. (FY 22 10K)

Video segment weakness may highlight challenging transition from legacy video appliance business: In Q4 22, Video segment revenue declined 20.7% year-over-year to $68.3 million. In addition, Video adjusted EBITDA margin declined 1,060 basis points to 9.3%. On its Q4 22 Conference Call, Harmonic attributed the Video revenue decline to an "extraordinarily strong" Q4 21. In addition, based on our understanding of representations made to us by the Company, the Video segment has a higher degree of operating leverage relative to the Broadband segment (i.e. a high fixed cost base). In our view, inconsistent Video segment performance despite announcing a "disruptive" transition to software/cloud video delivery in FY 14 suggests the Video segment transition may be more challenging than anticipated and/or long term in nature.

Video Segment Analysis
($ in millions)



FIFA World Cup viewership may have provided unsustainable SaaS revenue benefit: Harmonic began disclosing SaaS revenue on its quarterly conference calls in Q1 22. In Q4 22, SaaS revenue surged 51.3% year-over-year to $10.5 million. On its Q4 22 Conference Call, the Company indicated it was a "quarterly record" and attributed the growth to expanded consumer footprint and increased server consumption driven by live sports. Specifically, the Company highlighted the FIFA World Cup was a "notable international success" and the corresponding usage rate "exceeded" expectations.[5] Given the immense popularity of the FIFA World Cup and Company commentary highlighting service usage exceeded expectations, we are concerned SaaS revenue growth was driven, in part, by an event only occurring every four years and may create challenging comparable periods.

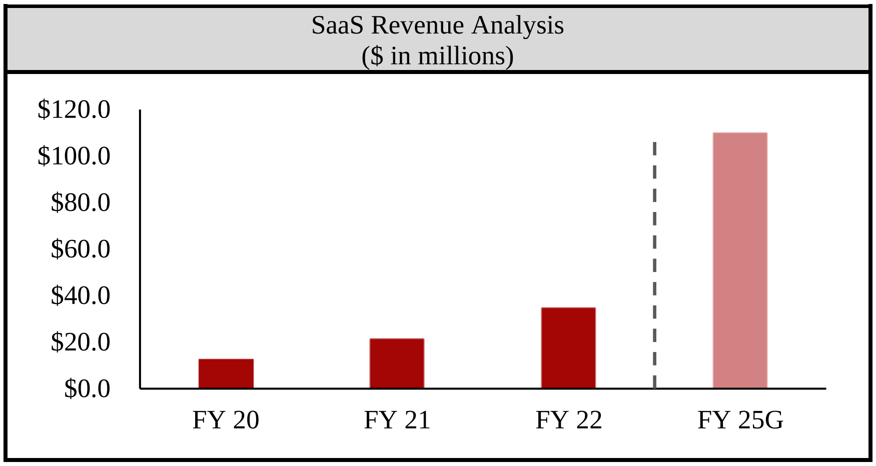
> Our streaming SaaS growth was again driven principally by larger media accounts expanding their consumer footprints and live sports content rights and correspondingly expanded consumption of our server. **The World Cup was a notable international success in the fourth quarter and SaaS usage exceeded our expectations** and feedback on the quality of service we delivered was action. (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23) [emphasis added]

SaaS Revenue Analysis ($ in millions)	Q1 22	Q2 22	Q3 22	Q4 22
SaaS revenue	$6.7	$8.6	$8.9	$10.5
Year-over-year	*75.3%*	*68.7%*	*63.9%*	*51.3%*

Long-term SaaS guidance may be optimistic and difficult to achieve amid highly competitive landscape: In FY 22, SaaS subscription revenue (as a percent of Video revenue) increased 62.9% (530 basis points) year-over-year to $34.7 million (12.7%). In its Investor Day Presentation on 09/16/22, Harmonic guided for FY 25 SaaS revenue of over $110.0 million representing an approximated 45.0% compound annual growth rate. In addition, Harmonic highlighted certain initial cloud competitors were acquired by large media companies and no longer in the market.

[5] The 2022 FIFA World Cup was played in Qatar from 11/20/22 to 12/18/22. According to FIFA, approximately 5.0 billion people engaged with World Cup content throughout the tournament and over 1.5 billion people watched the World Cup Final.

Specifically, iStreamPlanet was acquired by Warner Media, NeuLion by Endeavour, and Bamtech by Disney. In addition, Harmonic indicated it competed, to a lesser extent, with certain cloud providers, including Amazon Web Services (AWS) and application and subscriber management providers, such as Brightcove, Inc. (BCOV). While we acknowledge certain early cloud competitors were acquired, we are concerned certain acquirers (e.g. Warner Media and Disney) represent significant streaming market share with internalized video delivery. In our view, Harmonic's FY 25 SaaS revenue guidance may be optimistic and/or difficult to achieve given (1) certain large media may utilize internal streaming video delivery systems, (2) the streaming market remains highly competitive, and (3) significant costs and challenges associated with streaming (discussed next).



Bally Sports bankruptcy may highlight significant costs and challenges in video streaming industry: In its Investor Day Conference Call on 09/15/22, Harmonic highlighted live sports customers contributed 42.0% of SaaS Video revenue, with $100,000.00 average monthly recurring revenue (the highest SaaS cloud application category). Further, Harmonic highlighted Bally Sports, Peacock, and Sky were "very big" customers in its live sports category. In its article on 03/15/23, Business Wire reported Diamond Sports Group (i.e. Bally Sports parent company) voluntarily commenced Chapter 11 bankruptcy proceedings. Further, Diamond Sports indicated it would restructure in an attempt to eliminate over $8.0 billion in debt but would continue to broadcast live sports during its Chapter 11 proceedings.[6] In our view, a bankruptcy filing by a large live sports customer highlights the costs, challenges, and competition within the streaming market and may increase Video segment revenue risk. Our concerns are heightened given live sports customers had the highest average monthly recurring revenue in the Video segment.

> Diamond Sports Group, LLC ("DSG," "Diamond," or the "Company") announced that the Company is finalizing a Restructuring Support Agreement ("RSA") with holders of a majority of the Company's debt and Sinclair Broadcast Group, Inc. ("Sinclair") to eliminate over $8 billion of the Company's outstanding debt. To implement its restructuring, the Company filed for Chapter 11 protection in the U.S. Bankruptcy Court for the Southern District of Texas (the "Court"). (Business Wire Article, 03/15/23)

Inventory Level Surge May Highlight Margin Pressure, In Our View

Background on inventory and provisions: In its FY 22 10K, Harmonic disclosed inventory was recorded on a first-in, first out (FIFO) basis at the lower of cost or net realizable valuable. The Company estimates a provision for obsolete and excess inventory utilizing historical sales data, expected demand and market conditions, projected product life cycles, and current inventory levels, which is charged to cost of revenue (i.e. cost of goods sold).

Background on inventory analysis relative to revenue categories: In its FY 22 10K, Harmonic disclosed revenue by "Appliance and integration" and "SaaS and service." Appliance and integration includes non-recurring revenue from hardware, licenses, and professional services. SaaS and service revenue includes recurring revenue from usage

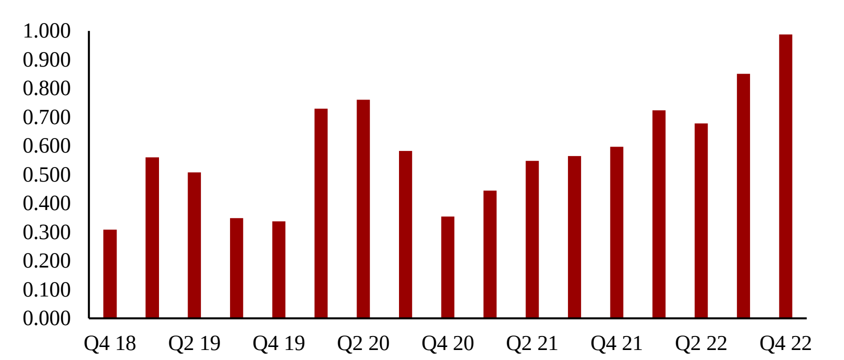
[6] https://www.businesswire.com/news/home/20230314006050/en/Diamond-Sports-Group-Commences-Voluntary-Chapter-11-Proceedings-to-Strengthen-Balance-Sheet

fees for its SaaS platform and service revenue from appliance-based customer support. Accordingly, we analyzed inventory relative to Appliance and integration revenue.

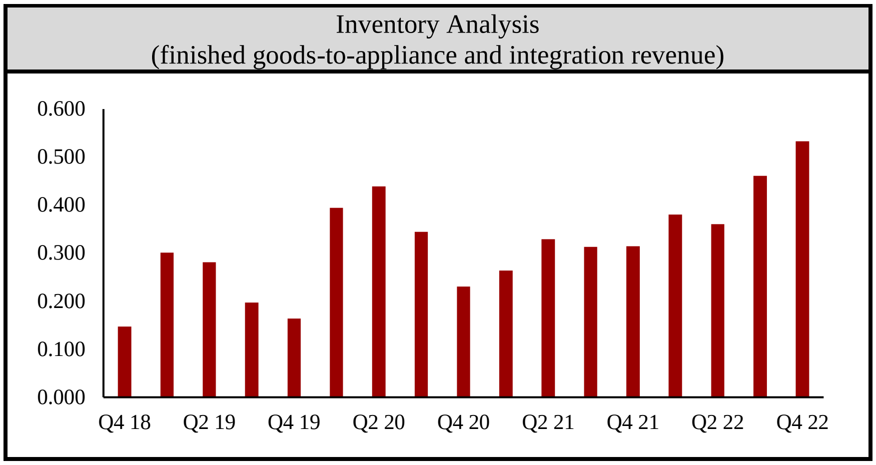
Elevated inventory levels may portend margin pressure, in our view: In Q4 22, inventory surged 69.9% year-over-year to $120.9 million, while appliance and integration revenue increased 2.7% to $122.5 million. Accordingly, inventory-to-appliance and integration revenue surged 65.5% to 0.987, the highest level in at least four years. On its Q4 22 Conference Call, the Company attributed the inventory build to (1) strong demand, (2) "proactive" supply chain management, (3) product availability improvements, and (4) flexibility for higher ocean freight instead of air. In addition, Harmonic guided to continue "strategically" building inventory in FY 23 to meet strong demand but indicated it had "optionality" in its working capital management and would maintain lower inventory levels should the supply chain improve. **Given (1) recent Comcast growth may be unsustainable, (2) Broadband revenue excluding Comcast declined materially in recent periods, and (3) the Video segment transition from appliance hardware to SaaS, we are concerned Harmonic may have overbuilt inventory relative to demand and margins may be pressured to the extent the Harmonic compelled to write down and/or discount certain products.**

> Increased inventory has, by design, enabled us to meet strong demand for our products and to proactively manage our supply chain, enhance product availability and provide us with flexibility to use a higher mix of ocean freight rather than air freight, resulting in improved gross margins. (CFO Mr. Sanjay Kalra, Q4 22 Conference Call, 01/30/23)

Inventory Analysis
(inventory-to-appliance and integration revenue)



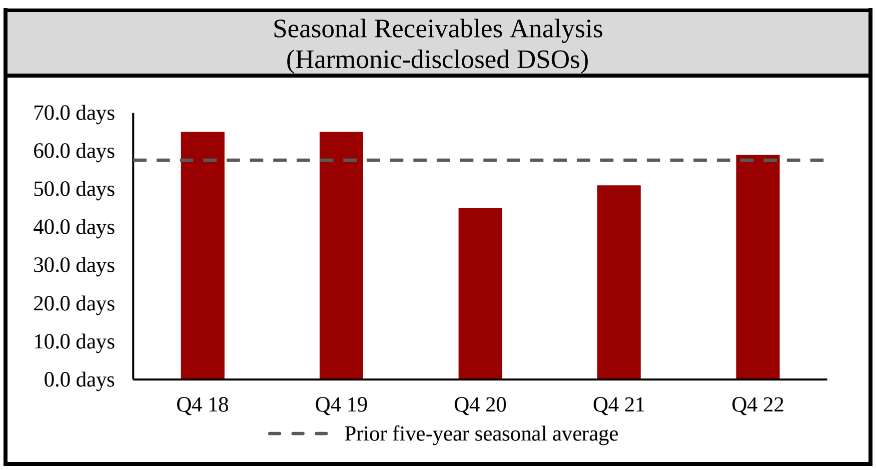
Elevated finished goods levels heighten our concerns: In Q4 22, finished goods surged 73.9% year-over-year to $65.3 million, while appliance and integration revenue increased 2.7% to $122.5 million. Accordingly, finished goods-to-appliance and integration revenue surged 69.4% to 0.533, the highest level in at least four years. In our view, elevated finished goods levels suggest inventory write down and/or discounting risk may be elevated and our overbuilt inventory and margin pressure concerns are heightened.



DSO Increase & Commentary Adjustment May Highlight Elevated Channel Fill

DSO increase may highlight channel inventory build, in our view: Harmonic discloses DSOs on its quarterly conference calls. In Q4 22, Harmonic-disclosed DSOs increased 15.7% year-over-year to 59.0 days. On its Q4 22 Conference Call, the Company highlighted certain customers slowed orders as lead times normalized. While we acknowledge receivable levels remained below Q4 19 and Q4 18 levels, we believe receivable levels were elevated given DSOs were at the highest seasonal level in three years and the Company adjusted its DSO conference call commentary to potentially mask the year-over-year build (discussed next). Accordingly, we believe elevated receivable levels may highlight overbuilt distributor/broadband operator channel inventory levels and our revenue pressure concerns are heightened. Our channel inventory concerns are heightened given commentary suggesting customers slowed orders as supply dynamics improved (i.e. customers may have over ordered amidst elongated lead times).

> Sensing the worst of the supply chain disruption risks are behind us, some customers slowed orders as a step towards normalizing advanced purchase lead times. Nonetheless, we again exited the quarter with near record backlog and deferred revenue. (CEO Mr. Patrick Harshman, Q4 22 Conference Call, 01/30/23)



DSO commentary language change may highlight elevated receivables and obfuscate analysis, in our view: Historically, Harmonic disclosed current quarter DSOs compared to the prior quarter (sequential) and prior year period (year-over-year) DSO in the prepared remarks of its quarterly conference calls.[7] On its Q4 22 Conference

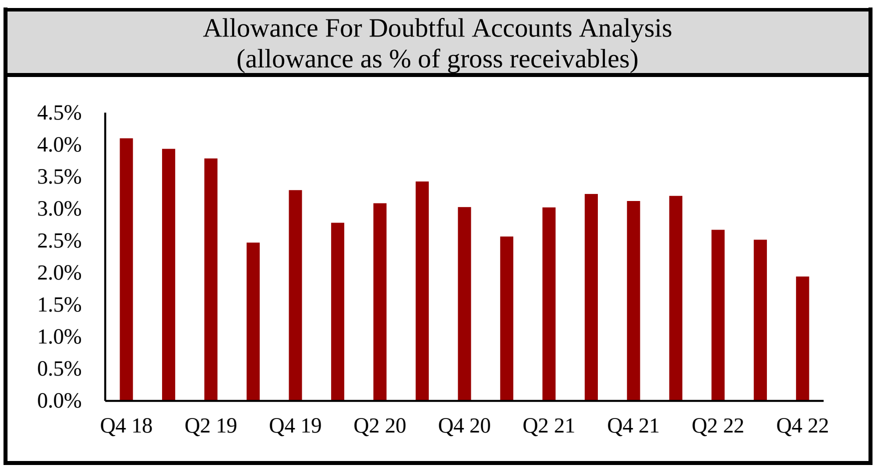
[7] Based on review of quarterly conference call transcripts, the current quarter, previous quarter, and prior year quarter DSOs were disclosed individually every quarter for at least the past six years.

Call, Harmonic disclosed Q4 22 DSOs were 59.0 days and "comparable" to the prior quarter and previous year period, however, the explicit Q3 22 and Q4 21 DSO numbers were not provided on the Q4 22 Conference Call, the first period in over five years the Company did not explicitly disclose prior quarter/prior year DSO. Given Q4 22 DSOs increased 15.7% year-over-year, we believe Q4 22 DSO was not "comparable" to the previous year period. We are concerned the change in the DSO commentary language on the Q4 22 Conference Call may be misleading and obfuscate analysis.

> Our days sales outstanding at the end of Q4 was 51 days compared to 54 days at the end of Q3 '21 and 45 days in Q4 2020. (CFO Mr. Sanjay Kalra, Q4 21 Conference Call, 01/31/22)

> Turning to days sales outstanding at the end of Q4, DSO was 59, **comparable to previous-quarter and previous year period.** (CFO Mr. Sanjay Kalra, Q4 22 Conference Call, 01/30/23) [emphasis added]

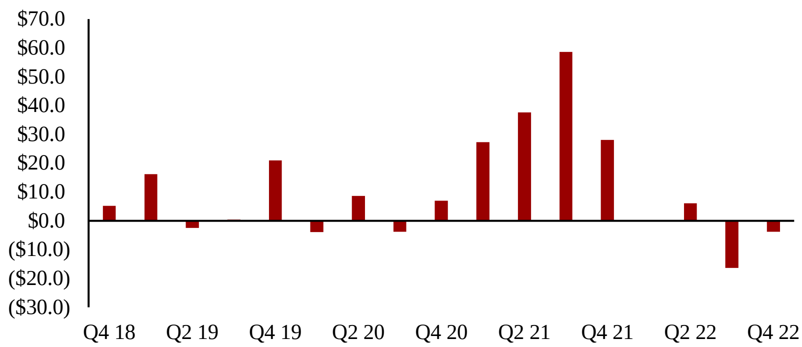
Allowance for expected credit losses and sales returns level decline may have provided unsustainable benefit: In Q4 22, the allowance for expected credit losses and sales returns declined 24.7% year-over-year to $2.1 million, while gross receivables increased 21.0% to $110.6 million. Accordingly, the allowance for credit losses as a percent of gross receivables declined 120 basis points to 1.9%, the lowest level in at least five years. In its FY 22 10K, Harmonic disclosed one customer accounted for over 10.0% of receivables. While Harmonic did not name the customer, we believe it was likely Comcast and Comcast receivables have low collectability risk. While we acknowledge increased Comcast revenue/receivable contribution may have driven a portion of the allowance decline, we believe historically depressed allowance levels may be unsustainable amid elevated trade receivables and/or to the extent Comcast revenue contribution declines. To the extent the allowance levels do not continue to decline and/or Harmonic is compelled to increase allowance levels, we would be concerned about margin sustainability and/or pressure.



Cash Flow Deterioration Heightens Our Earnings Sustainability Concerns

Historically depressed free cash flow levels highlights earnings sustainability risk, in our view: In Q4 22, twelve-month cash flow from operations (CFO) declined 86.6% year-over-year to $5.5 million, while capex declined 28.7% to $9.3 million. Accordingly, twelve-month free cash flow declined $31.8 million year-over-year to negative $3.8 million. In addition, accounts receivable (inventory) consumed $23.1 million ($54.4 million) of cash. On its Q4 22 Conference Call, the Company indicated it invested cash in inventory to "meet demand and support growth." Negative free cash flow and working capital-driven cash consumption heighten our earnings sustainability concerns.

12M Free Cash Flow Analysis
($ in millions)



Other Observations: Insider Selling, CFO Departure, & Shareholder Dilution

Material insider selling heightens our earnings sustainability concerns: On its Q4 22 Conference Call, the Company represented it was "optimistic" and "confident" in its business in FY 23 and beyond. Further, Harmonic highlighted it had "tremendous momentum in the market." From the Proxy Statement record date (04/02/22) to the date of this publication, Harmonic insiders sold 710,342 shares despite recent commentary expressing confidence and market momentum. For example, CEO Mr. Patrick Harshman sold 296,349 shares and Broadband SVP Mr. Nimrod Ben-Natan sold 279,835 shares, representing 19.4% and 54.7% of their 04/02/22 beneficial ownership, respectively. While we acknowledge insiders may have received/earned additional shares since the Proxy Statement date (i.e. the beneficial ownership decline may be somewhat overstated) and certain divestitures related to the exercise and sales of options close to expiration (i.e. less than one year until expiration), the recent material (in our view) insider selling heightens our earnings sustainability concerns.

Insider Sales Analysis	Shares Sold From 04/02/22 to Publication Date	As % of 04/02/22 Beneficial Ownership
CEO Mr. Patrick Harshman	296,349	(19.4%)
SVP Mr. Nimrod Ben-Natan	279,835	(54.7%)
CFO Mr. Sanjay Kalra	53,585	(35.8%)
SVP Mr. Neven Haltmayer	50,000	(25.8%)
SVP Mr. Ian Graham	30,573	(24.8%)
Total	710,342	--

CFO turnover may increase business disruption risk, in our view: In its 02/16/23 Press Release, Harmonic announced CFO Mr. Sanjay Kalra was resigning effective 03/03/23 to pursue other opportunities. The Company's senior vice president of business development Mr. Jeremy Rosenberg was named interim CFO, while Harmonic initiated a permanent CFO search. In its Press Release on 03/01/23, Paymentus Holdings, Inc. (PMT) announced Mr. Sanjay Kalra would be appointed CFO effective 03/06/23. In our view, the CFO turnover amidst an impending large customer contract renewal may increase business disruption risk.

Shareholder dilution may highlight increased investment risk, in our view: In FY 22, Harmonic's diluted weighted average share count increased 5.8% year-over-year to 112.4 million. On its Q4 22 Conference Call, the Company attributed the share increase primarily to (1) shares issued for premium settlement of debt conversions, (2) an increase in outstanding convertible debt dilution, and (3) the dilutive impact of outstanding restricted stock units (RSUs) and options. In addition, Harmonic guided for FY 23 diluted weighted average share count to increase 5.3% to 118.3 million shares. In our view, FY 22 shareholder dilution and the potentially dilutive impact of share-based compensation highlights elevated dilution risk.

Diluted Weighted Average Share Count Analysis	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23G
Harmonic share count (in millions)	85.6	89.6	97.0	106.2	112.4	118.3
Year-over-year change	--	*4.6%*	*8.3%*	*9.5%*	*5.8%*	*5.3%*

Conclusion

We are concerned material and increasing customer concentration with Comcast suggests revenue sustainability risk may be elevated. Our concerns are heightened given (1) uncertainty surrounding an impending Comcast agreement renewal, (2) warrant vesting may have provided Comcast certain incentive to complete the initial agreement, and (3) Comcast may have and continue to pull forward orders prior to incentives expiring. In addition, we believe depressed Broadband (excluding Comcast) revenue suggests other Tier 1 customer deployments may be less lucrative/longer-term initiatives and significant growth from other Tier 1 customers may prove challenging. In our view, a recently announced partnership with Charter may provide limited near-term revenue growth given (1) an uncertain project timeline/scope, (2) network complexity, (3) network transformations are long-term in nature, and (4) Charter selected another vendor for its DAA hardware needs. In our view, Harmonic's market leading position in vCMTS may be pressured given evidence of established competitors entering the virtual broadband access market. In addition, we believe Harmonic DAA market share may decline to expected levels given recent evidence of broadband operators selecting competitor devices for DAA buildouts. We believe Harmonic's Video segment transformation and long-term guidance may be difficult to achieve given a highly competitive and costly video streaming landscape. We are concerned inventory/finished goods may be overbuilt relative to demand and margins may be pressured. Our earnings sustainability concerns are heightened given (1) elevated receivable levels may highlight a channel fill, (2) cash flow deterioration, (3) insider selling, (4) a recent CFO departure, and (5) evidence of shareholder dilution.

Risks to Our Thesis & Valuation

Tier 1 Adoption, Market Leader, Broadband Growth, & Award Winning Tech

Large Tier 1 Adopters: On its Q4 22 Conference Call, Harmonic highlighted it was "increasingly confident" in acquiring new Tier 1 customers in FY 23 and beyond. As mentioned, Harmonic announced it would partner with Charter to provide next generation broadband services using Harmonic's virtualized CMTS technology (i.e. CableOS). In addition, Harmonic highlighted Charter would deploy its CableOS Platform through distributed access architecture for multi-gigabit DOCSIS 3.1 and 4.0 capability. The Press Release did not disclose the scope or timing of deployment. In FY 22, Charter's total capital expenditures were $9,376.0 million, 23.9% above Comcast's $7,568.0 million.

> Charter Communications will deploy Harmonic's CableOS Platform in a distributed access architecture for converged multi-gigabit DOCSIS 3.1 and 4.0, creating a flexible and sustainable foundation for market-leading connectivity services. Harmonic's Emmy Award-winning CableOS cloud-native solution powers over 90 innovative broadband service providers worldwide, including leading operators in the U.S., Europe, Latin America and Asia. (HLIT Press Release, 03/20/23)

Market leader in vCMTS and DAA: On its 06/14/21 Special Conference Call, Harmonic represented it "pioneered" the network transformation from hardware CMTS to virtualization and was "the first" to bring a virtualized cloud-native cable access solution to market. On its Barclays 2022 Global Technology, Media and Telecommunications Conference Call on 12/08/22, Harmonic indicated there was "no scale competing solution" for virtualized broadband access. In addition, Harmonic represented the latest Dell'Oro Group market research report highlighted it maintained 100.0% of the vCMTS market and 70.0% of the DAA hardware endpoints.

> So why are we winning in this market? So we basically pioneered this network transformation. And we were the first to bring to market a fully virtualized cloud-native cable access solution. The foundation is based on a platform enabling multiaccess technologies. We started with virtual CMTS for DOCSIS and have since expanded into other access technologies such as fiber and PON, inventing this category, which, by the way, we did there similar thing years ago which was the EdgeQAM market was driven by strong conviction that software and virtual network function can be a game changer for the Cable Access networks. (SVP Mr. Nimrod Ben-Natan, Special Conference Call, 06/14/21)

Broadband industry growth: In its FY 22 10K, Harmonic highlighted its revenue was historically dependent on cable, satellite, telco, broadcast, and media industry spending. In its 07/28/22 Press Release, Dell'Oro Group, a source for telecommunication market information, predicted broadband spending would grow to $23.4 billion in 2026.[8] Specifically, sales of passive optical network (PON) equipment, customer premise equipment (CPE), and cable broadband access equipment would all increase through 2026 as providers expand broadband reach, quality, and reliability. Cable distributed access equipment (i.e. virtual CCAP, remote PHY/MACPHY devices, and remote OLTs) was projected to grow to approximately $1.3 billion as broadband operators ramp fiber and DOCSIS 4.0 deployments. DOCSIS 4.0 is next-generation broadband providing improved reliability, security, and latency. Specifically, the technology supports up to 10 gigabits per second (Gbps) download speeds and up to 6 Gbps upload speeds. The technology can be deployed over existing fiber and coaxial networks, however, updates are needed for certain hardware (e.g. nodes, shelves, switches, etc.) throughout the configuration.

> Revenue for Cable Distributed Access Equipment (Virtual CCAP, Remote PHY Devices, Remote MACPHY Devices, and Remote OLTs) is expected to reach nearly $1.3 B by 2026, as operators ramp their DOCSIS 4.0 and fiber deployments. (Dell'Oro Group Press Release, 07/28/22)

Award winning technology: In its Press Release on 02/07/23, Harmonic announced it won a Technology and Engineering Emmy Award from the National Academy of Television Arts & Sciences (NATAS) for pioneering,

[8] https://www.delloro.com/news/broadband-spending-boom-will-push-market-to-23-4-b-in-2026/

developing, and deploying its innovative vCMTS platform. Harmonic highlighted its vCMTS solution had experienced “explosive growth” and was “transforming” the broadband industry.

> Harmonic's virtualized broadband technology has seen explosive growth, transforming the broadband industry by enabling more rapid and cost-effective scaling of gigabit access networks. Winning the Emmy Award is an acknowledgement of Harmonic's technology innovation, engineering creativity, and continued leadership in shaping the next generation of broadband and streaming video services. (HLIT Press Release, 02/07/23)

Valuation Analysis

As of the date of this publication, Harmonic’s shares traded at 21.4x next twelve-month earnings, 29.4% below its five-year average.

Valuation Analysis	Publication Date	1Y Ago	3Y Ago	5Y Average
NTM P/E	21.4x	22.1x	34.8x	30.3x

Disclaimer and Disclosure

This report was produced by Voyant Advisors, LLC ("Voyant"). The following Research Analysts employed by Voyant contributed to this report: Graeme Lazarus, Ryan DesJardin, Michael Meehan, and Andrew Brown. Voyant's home office is at 15373 Innovation Dr, Suite 365 San Diego, CA 92128. The firm's home office is where information about the valuations herein are located, unless otherwise indicated in the report.

At the time of this report, Voyant expects to provide updates on a quarterly or semi-annual basis depending on the frequency of when the above company discloses material financial results. We will cease providing updates if we are discontinuing research coverage as disclosed on the front page of this report in the Thesis Summary.

Voyant has not provided previous recommendations concerning the same financial instrument or issuer during the preceding twelve-month period.

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