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Technology - Hardware
Initiating Coverage
June 12, 2024
BUY

Peraso, Inc.

Peraso: An Undiscovered Leader in the Emerging mmWave Space: Buy, $3.75 PT

PRSO (NASDAQ)

Company & Market Data	
Closing Price (as of 06/11/2024)	$1.27
Rating:	BUY
Price Target:	$3.75
52 Week Range:	$1.17 - $28.40
Avg Daily Volume (M):	1,097.2
Shares Outstanding (MM):	2.6
Market Capitalization (MM):	$3
Enterprise Value (MM):	$1
Fiscal Year End:	Dec

Estimates	2023A	2024E	2025E
EPS			
1Q	$(0.08)	$(0.73)A	—
2Q	$(0.11)	$(0.36)	—
3Q	$(0.02)	$(0.25)	—
4Q	$(8.19)	$(0.07)	—
Full Year	$(8.40)	$(1.40)	$(0.35)
Revenue (MM)	$13.7	$16.8	$16.0
EBITDA (MM)	$(11.3)	$(8.8)	$(3.9)

Ratios			
P/E	NA	NA	NA
EBITDA (M)	(0.0)	(0.0)	(0.0)
EV/EBITDA	(0.1)x	(0.2)x	(0.4)x

Chart data: Bloomberg

mmWave Systems -- A Large and Growing Market: According to research from Grandview Research (January 2024) the global millimeter wave technology market in 2023 reached a value of $3.75 billion. As mmWave technology usages in consumer-related applications make up a relatively new market, this technology is slated to grow rapidly with an expected (CAGR) of nearly 40% through 2030 and exceed $55 billion by the end of the decade. The market is being driven by the rising use of bandwidth-intensive applications, and a growing need for high-speed transmission rates for IoT applications, object identification, and security scanners.

Peraso's Technology: Since its inception in 2009, Peraso has been solely focused on the development of mmWave solutions and has a core competency in phased-array technology, or beamforming/steering, in which an array of antenna elements work in unison to create a focused RF beam. The company is a leader in the production of mmWave devices and has also pioneered high-volume mmWave production test methodologies using standard low-cost production test equipment, positioning Peraso in a leadership position in meeting the operational challenges of delivering mmWave products into high-volume markets.

Competitive Positioning: Peraso's competitive advantages are derived from its intellectual property (96 granted patents) and its success in overcoming the unique technical challenges presented by mmWave technology such as maximizing throughput while not impacting the latency of the signal. Additionally, the company has successfully developed complete mmWave antenna modules for license-free 60 GHz applications, integrating the mmWave ICs and antenna into a single device. The integrated modules allow Peraso to guarantee the performance of the amplifier/antenna interface and simplify customers' RF engineering, which facilitates more sales opportunities as well as shortens the time to market for new products.

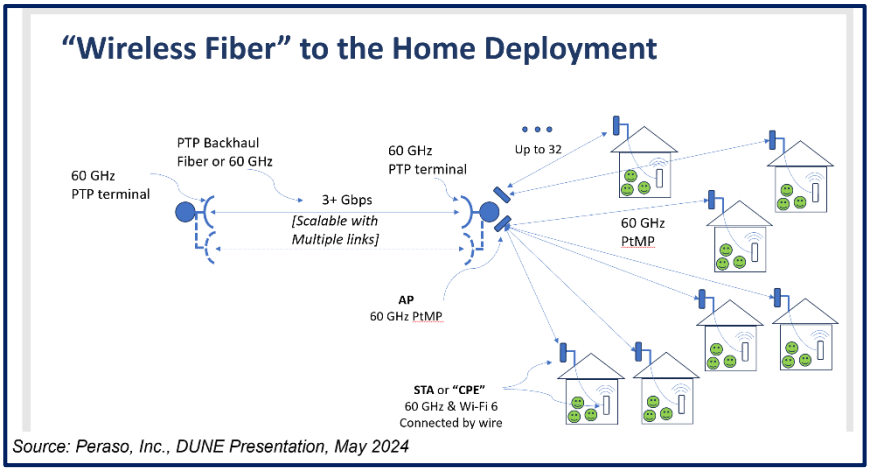
Earnings Model: With our initiation, we are introducing an earnings model for 2024 and 2025. We anticipate revenues of $16.8 million for 2024 (up 22.3% year over year) and $16 million for 2025. The marginal decline in 2025 from 2024 is due solely to the termination of the company's memory IC business (a loss of roughly $9 million in annual revenues). We anticipate that the sales volume of mmWave products will increase sufficiently to make up for most of the memory revenue loss. As such, our model for 2025 anticipates $12.5 million in mmWave products, up 160% year over year.

Our Outlook: Given the current size of the mmWave market and the expected rapid growth, we believe Peraso's market-leading silicon and module solutions position the company for an extended period of notable top- and bottom-line growth. We estimate revenue growth near 22% for 2024 and expect mmWave product revenue to expand by 160% year/year in 2025. With the expected growth for mmWave solutions, we believe Peraso should be valued based on a multiple (3x) of its 2025 estimated revenues discounted back to the present at 20%. As such, we initiate coverage of Peraso, Inc. (PRSO) with a Buy rating and 12-month price target of $3.75 (see the Valuation section on page 11).

Investment Summary

During the first quarter of 2024, the global 5G subscriber base crossed above 1.42 billion up 5% year over year, and is currently growing at 2x the pace of the previous 4G global adoption. The US, China, South Korea, and Japan are the top four nations leading 5G adoption. The rapid adoption of 5G is a testament to the predominance/expectation of an "always connected" environment in the US.

The demand for internet access "everywhere and 24/7" is straining the available communications bandwidth as the traditional radio frequencies (sub 6GHz) used by wireless service providers is becoming extremely congested. Additionally, in many locations, the use of fiber/cable is prohibitively expensive or simply unsuitable. In an effort to increase/improve the available bandwidth for internet access, the industry is moving to adopt mmWave technology. This technology utilizes radio waves with millimeter wavelengths with the associated frequencies falling in the 24GHz to 100GHz range on the electromagnetic spectrum. This range of radio frequencies is



Source: Peraso, Inc., DUNE Presentation, May 2024

unlicensed[1] RF spectrum. With a mmWave-based (or Fixed Wireless Access) network the digital information is embedded in a directed, shaped beam of electromagnetic radio waves (generally in the 34 to 60GHz spectrum). All this type of network requires is a line-of-sight connection from the transmitting terminal (usually located on a building rooftop) to the receivers placed at the end customers' locations (see the image above). Current mmWave technology allows for point-to-multipoint networks[2] and as there is no underground cabling or use of licensed spectrum, there are only minimal governmental regulations, no required permissions, and/or fees.

Though the use of mmWave technology for the commercial delivery of broadband internet is a relatively new market it is already quite large with a current estimated value of $3.75 billion (Grandview Research, January 2024). As an early participant, Peraso, Inc., has developed a portfolio of high-performance mmWave ICs, software, and fully integrated solutions encompassing mmWave antennas, RF phased array transceivers, on-the-fly beam calibration, and adaptable beam steering.

Peraso is one of a select few companies with mmWave design expertise that is also able to ship mmWave ICs and modules in volume. Though revenue results since the 2021 merger with Mosys, Inc., have been somewhat uneven (due in large part to an industry-wide inventory correction), the company now appears poised to begin a fresh chapter marked by increasing market demand and several new wins. Given the growth expected by industry participants in the worldwide broadband delivery market and the company's leading product lineup, we anticipate Peraso to generate year-over-year revenue growth of 22% for 2024 with revenues approaching $16.8 million. Additionally, we estimate revenues in 2025 to remain flat as the company transitions out of the IC memory segment. Based on our earnings model we are initiating coverage of Peraso, Inc., with a Buy rating and price target of $3.75.

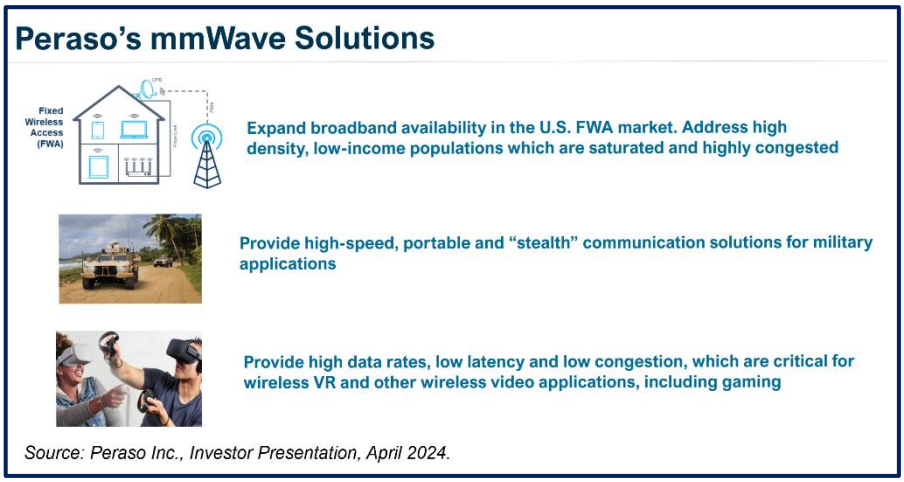
[1] Unlicensed Spectrum is a part of the electromagnetic spectrum that can be assigned to or shared with anyone for non-exclusive usage. It is subject to some regulatory constraints, but users do not need permission from the FCC.

[2] With the Peraso mmWave technology one transmitting terminal can connect with up to 32 receiving terminals.

Peraso, Inc., Company Overview

Founded in 2009, by Ronald Glibbery and Brad Lynch, Peraso Inc. is a fabless semiconductor company headquartered in Toronto, Canada. Since its inception, the company has been a pioneer/leader in the development of integrated circuits for the mmWave (30GHz to 300GHz) wireless communication sector. Historically, the company's chipsets and solutions have been designed to operate in high-frequency bands between 24GHz and 60GHz with a focus on hardware and software for Fixed Wireless Access, consumer electronics (VR), and 5G antenna modules. The company introduced its first-generation chipsets in 2012, targeting applications like wireless docks and wireless displays. In 2016, Peraso's mmWave technology was integrated into consumer products, including wireless docking stations and VR headsets. Later in 2018, with improved beamforming and antenna technologies, Peraso expanded its product portfolio and announced a number of partnerships with leading Wireless Internet Service Providers to integrate its 60 GHz technology into mmWave-based wireless networks.

Peraso remained a private Canadian-based company funded primarily with venture capital backing until 2021 when the company completed a reverse merger (business combination) with MoSys, Inc., a publicly traded provider of integrated circuits and intellectual property solutions encompassing fast, high-density SRAM memory chips. The merger was finalized in December 2021 with Peraso, Inc., as the controlling entity, and the shares of the combined entity began trading on the NASDAQ under the symbol, "PRSO". Though Peraso Inc.'s future business strategy is focused on the mmWave product line, the majority of past and current revenues have been and continues to be from the sale of Mosys memory chips[3]. The memory chip product line is (and has been) important from a cash generation standpoint, but this segment is not



Source: Peraso Inc., Investor Presentation, April 2024.

tied to Peraso's longer-term growth.

Today Peraso is a leader in high-performance mmWave wireless technology, offering market-ready chipsets, modules, and software for mmWave applications. Peraso supports a variety of applications (see the image above), including FWA, immersive video and factory automation, and stealth communications solutions aimed at military applications. In addition, Peraso's solutions for data and telecom networks focus on Accelerating Data Intelligence and Multi-Access Edge Computing, providing end-to-end solutions from the edge to the centralized core and into the cloud.

Post the merger with Mosys, Inc., Peraso enjoyed solid revenue growth through mid-2023 based on strong demand from its two primary customers for FWA infrastructure. In late Summer 2023, the semiconductor manufacturers began experiencing a significant slowdown in new orders due largely to an industry-wide inventory correction. Peraso was not immune to this industry trend and orders/shipments of mmWave products declined precipitously into early 2024. Currently, the company is

[3] This product line is now on an end-of-life (EOL) basis as the manufacturer (TSMC) has notified Peraso that it is shutting down the wafer manufacturing process for these memory chips. As such the company expects to eliminate the sale of these memory chips early in 2025.

experiencing a modest rebound as customer ordering volumes have begun to improve. Importantly, Peraso has recently announced Panasonic System Networks has adopted Peraso's X710 chipset for its new 60GHz WLAN solution. Additionally, one of Peraso's larger customers, WeLink (a WISP), signed a historic public-private partnership with Los Angeles County to bring high-speed internet to as many as 275,000 households and businesses across 68 square miles in East Los Angeles/Boyle Heights and South Los Angeles[4]. This deployment will require more than 300,000 modules to be installed during the next 10 years.

Currently, Peraso is moving through the above mentioned inventory correction with its mmWave customers and anticipates more robust growth in the back half of this year. We believe the company has sufficient cash/orders to support operations through early next year, by which time (we believe) the anticipated growth from mmWave silicon will be more clear. We are anticipating revenues mmWave revenues for calendar 2024 to approach $4.7 million and climb significantly in 2025 to $12.5 million.

mmWave Market Development

History

As the name suggests, mmWave is an abbreviation for electromagnetic waves with wavelengths in the range of 1mm to 10 mm. These wavelengths convert into frequencies with a range of 30-300 gigahertz (GHz). Because the millimeter wave band has relatively long wavelengths the frequency of the waves is high. So high in fact that this section of the radio spectrum has been designated as the "extremely high frequency" (EHF) band by the International Telecommunication Union (see the chart above). Compared with existing wireless communication techniques, such as WiFi and 4G, mmWave-based communication systems utilize much higher carrier frequencies and thus come with advantages including much greater bandwidth capacity (bandwidth = 2X the frequency of a wave), narrow beams, high transmission quality, and strong detection ability.

Radio Frequencies

Radio Band	Frequencies	Appilcations
Medium	30 KHz to 3 MHz	AM Radio
High	3 MHz to 30 MHz	CB Radio, Ham Radio
Very High	30 MHz to 300 MHz	FM Radio, VHF TV
Ultra High	300 MHz to 3 GHz	UHF TV, Cell Phones,
Super High	3 GHz to 30 GHz	Microwave Links, WiFi in 5G
Extra High	30 GHz to 300 GHz	Microwave Links

Source: Ladenburg Thalmann using standard industry/scientific metrics and nomenclature

Due to the wide bandwidths and high data rates, millimeter wave spectrum (and technologies) have long been used in satellite communication and radar systems, but it is only in the last 10 to 15 years that the technology advanced to allow for the utilization of mmWave frequencies in more consumer/mass-market applications. Industry historians mark the beginning of the mmWave story with the scientist Jagadish Chandra Bose who in 1897 conducted groundbreaking experiments to measure various properties of materials using millimeter waves. Until the late 2000s, the scientific community viewed the mmWave spectrum as suitable for only a limited number of applications such as short-range communications, and satellite systems. However, in 2009, researchers at Samsung (005930.KS, 75,200, Not Rated) discovered that new beamforming[5] technologies could potentially overcome the associated technical (distance and direction of the wave) hurdles for the use of mmWaves in wireless communications[6]. At this early stage, the R&D effort aimed at mmWave use for wireless communications split in two with Samsung leading the effort to use mmWave in 5G applications licensed spectrum (24GHz to 43GHz). Simultaneously, Peraso, Qualcomm (QCOM, $208.52, Not Rated) and others focused on developing mmWave for use in unlicensed spectrum (60GHz).

[4] Los Angeles County chooses WeLink to serve FWA to 275,000 locations (fierce-network.com)

[5] Beamforming involves the use of an array of antennas to directionally focus a series of waves into a beam of the desired width (and distance). The key was to design antennas that were small, efficient, and cost-effective.

[6] These researchers proposed using mmWave bands for future wireless communications in a 2011 IEEE magazine paper.

During the 2010 decade, researchers associated with Samsung, Qualcomm, Peraso, and others moved the use of mmWaves in wireless communications from the lab to real-world practice. This process required various engineering achievements/breakthroughs including radical improvements in silicon to allow for beam-forming, beam-steering, and beam-tracking techniques needed to mobilize mmWave and provide the cost-effective integration of large numbers of antenna elements into phased-array RFICs.

With these technological advancements, mmWaves are now being used in a broad range of products and services, such as high-speed, point-to-point WLANs and broadband access. Other uses of mmWaves include the following:

- **5G cellular telecommunications**: Cellular networks are able to use mmWaves in the 24 to 39 GHz bands to provide high-bandwidth capabilities for venues such as stadiums/areas with a lot of users in a confined space.
- **IoT Devices:** The high bandwidth capacity of mmWaves is ideal for applications such as short-distance wireless transmission of ultra-high-definition video and communications.
- **Autonomous vehicles**: The limited propagation distance and high data rates associated with mmWaves are ideally suited for communications between these vehicles.
- **Airport security scanners:** mmWave frequencies in the range of 70 to 80 GHz allow for precision scanning of bodies and cause less harm to subjects.

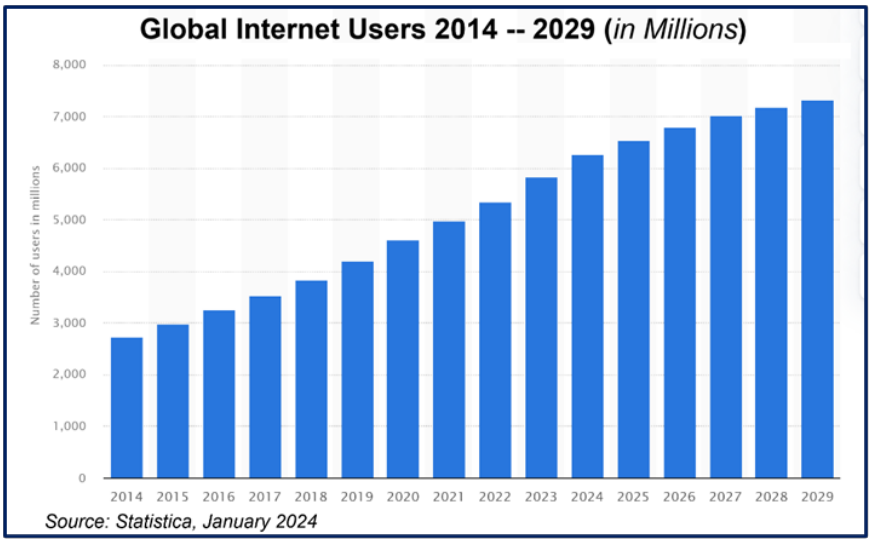
Market Size and Future Growth

According to research from Grandview Research (January 2024) the global millimeter wave technology market in 2023 reached a value of $3.75 billion. As mmWave technology usages in consumer-related applications make up a relatively new market, this technology is slated to grow quite rapidly with an expected (CAGR) near 40% from 2024 to 2030 and exceed $55 billion by the end of the decade. The market is being driven by the rising use of bandwidth-intensive applications, a growing need for high-speed transmission rates for IoT applications, object identification, and security scanners.

Though there are serval important use cases, the primary factor in the growth of mmWave solutions is the ongoing growth in the use of the internet or WWW. This growth has two primary drivers; an increasing number of users and the growing time users are spending online for both personal and business-related applications.

Internet Users

Recent research from Statistica suggests that the global number of internet users is forecast to increase by a total of 1.1 billion users (+16.92%) during the period from



2024 to 2029 with the number of users estimated to reach 7.3 billion in 2029 continuing the long-term growth trend of in the number of users of the past two decades.

Internet Usage Growth

The Internet continues to transform how we as individuals connect with others, consume and organize information flow, share knowledge, shop, obtain entertainment, and generally use the web as an integral part of our daily lives. To this point, as of the second quarter of 2023, the average time spent on the internet per person had climbed to 6 hours and 41 minutes per day. Some of the specific online activities that are fueling this growth include:

- **Streaming:** The global digital landscape is evolving rapidly, and streaming services (both music and video) are deeply entwined with this transformation. Research from Parks Associates indicates that on average U.S. Internet households are now streaming digital media more than 21 hours per week, with streaming on TVs up 31% since last year. 99% of households in the US now subscribe to at least one streaming service, with the number of streaming subscriptions expected to reach 1 billion (up 100% since 2018).
- **Social Media:** As of 2023, more than five billion people use social media worldwide with approximately 260 million new users each year. The average person spends about 2.5 hours per day using social media and the social media app market had a total value in 2022 of $49.09 with an anticipated CAGR of 26% through 2030[7].
- **Artificial Intelligence Usage:** AI applications, especially deep learning models, require substantial computational resources for training and inference. As AI models grow in complexity and size, the demand for computational throughput will increase proportionally. Specifically, AI workloads in the cloud demand both high-speed networking and storage and efficient data transfer, which will impact bandwidth requirements.
- **Online commerce:** Another key driver behind the growth in the time spent online has been (and remains) the continued expansion in online commerce. Online commerce began with the introduction of consumer-friendly web browsers in the 1990s and is now a trillion-dollar market segment. A recent report released in November 2023, by eMarketer projects that e-commerce volumes in the US exceeded $1.1 trillion in 2023 and will likely climb another $1.4 billion in 2024. Much of the growth in online shopping can be traced to the introduction (2007) of the first iPhone, setting in motion the ongoing phenomenon of the "always-connected mobile consumer." The ability to stay connected continues to drive the use of smartphones and tablets for work, shopping, and for socializing. To this point, 66.6% of the global population now use a mobile device, roughly 280 million Americans (84.2%) are using their smartphones to access the internet, and on average the population is now spending around five hours a day on their smartphones[8].

Communications/5G

All of the above are important factors in the ongoing demand for more bandwidth and higher-speed online access, however, the largest market driver is in the communications space, specifically mobile cellular traffic. Even now, the vast majority of commercial wireless networks all use the RF spectrum between 800 MHz and 6 GHz (the sub-6 GHz band). The result is that all the 3G/4G/5G cellular connections for smartphones, home/office/airport, etc., Wi-Fi networks, all

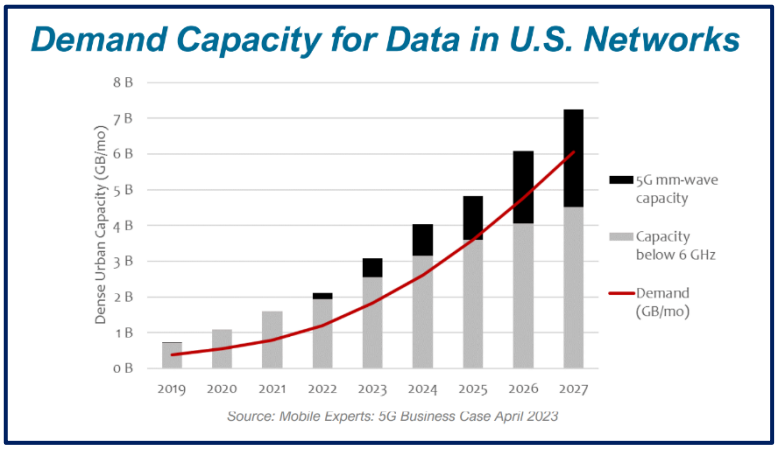
[7] Global social media statistics research summary 2024 [Jan 2024] (smartinsights.com)

[8] Mobile Marketing Statistics: The Ultimate List in 2023 (luisazhou.com)

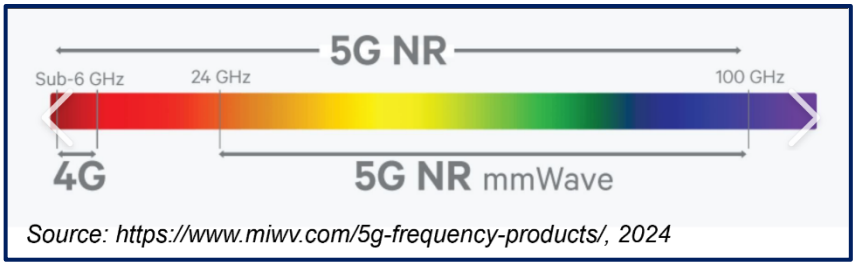
Bluetooth connections, cordless telephones, and almost every connected device will use those frequencies to transmit information. Thus, while the number of users and devices consuming data continues to expand, the available radio spectrum frequency remains fixed. To this point, forecasts from Statistica anticipate that mobile data traffic will climb to nearly 330 exabytes per month by 2028, up more than three times the volume consumed in 2022.

The markets' reaction to the challenge of providing increased bandwidth has been centered primarily on the rollout of 5G (the 5th Generation) of wireless networks. 5G technology provides higher speeds, lower latency, and significant increases in capacity, opening up new applications and use cases in sectors such as healthcare, connected cars, education, public safety, and advanced gaming.

5G adoption began in 2019 and current estimates from the Ericsson Mobility report (2023) put global 5G subscriptions at 1.6 billion. The report also predicts a growth forecast during the next six years of 5.3 billion subscribers by 2029, up more than 330%. The problem is that (see the image below) the capacity for 5G



in the sub-6GHz spectrum is predicted to be maxed out in 2025, necessitating the need to utilize other (higher) frequencies (and related technologies). Key solutions to satisfying the growing data capacity demands include deploying 5G in the mmWave spectrum (see image below) and deploying mmWave fixed



Source: https://www.miwv.com/5g-frequency-products/, 2024

wireless access (FWA) infrastructure using 60Ghz spectrum or WiGig. Though these are relatively new technologies, the market opportunity for both solutions is already quite large. The mmWave 5G market size is predicted to grow at a CAGR of 14.7% from 2022 through 2032, reaching $10.1 billion by 2032 (nearly triple the $2.58 billion value in 2022)[9]. FWA technology is also gaining increased adoption as this technology does not need wires or cabling and is ideal in dense urban settings and rural areas where laying fiber is prohibitively expensive. In 2021, there were approximately 2,800 fixed wireless-centric ISPs serving 6.9 million subscribers[10]. By the end of 2025, this number is projected to grow to 12.7 million subscribers. This growth is being driven by improved/less expensive FWA solutions, the use of the unlicensed spectrum in the 24GHz to 100GHz range, and the ongoing governmental support/funding for WISPs to expand their network coverage to underserved rural areas.

[9] 5G mmWave Technology Market to Reach $10.1 Billion, Allied Market Research, February 14, 2024

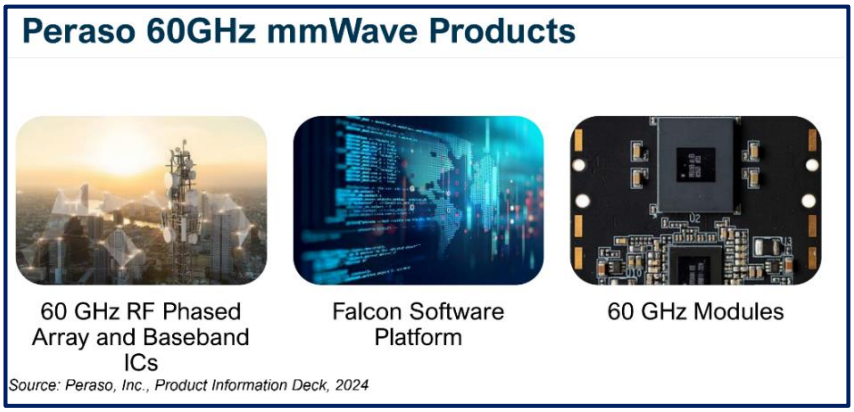
[10] The 2021 Fixed-Wireless and Hybrid ISP Industry Report by the Carmel Group

Peraso's Product Suite and Revenue Model

Pursuing a successful research and development path since its inception in 2009, Peraso, Inc., is now a global leader in the delivery of mmWave silicon. The company has invested more than $100 million in mmWave device development, creating an extensive body of patented core competencies in mmWave solutions, including:

- mmWave radio frequency circuits
- mmWave signal processing algorithms
- beam forming and beam steering algorithms
- real-time calibration and system monitoring
- low cost, high-performance antenna technology
- high volume production test capabilities

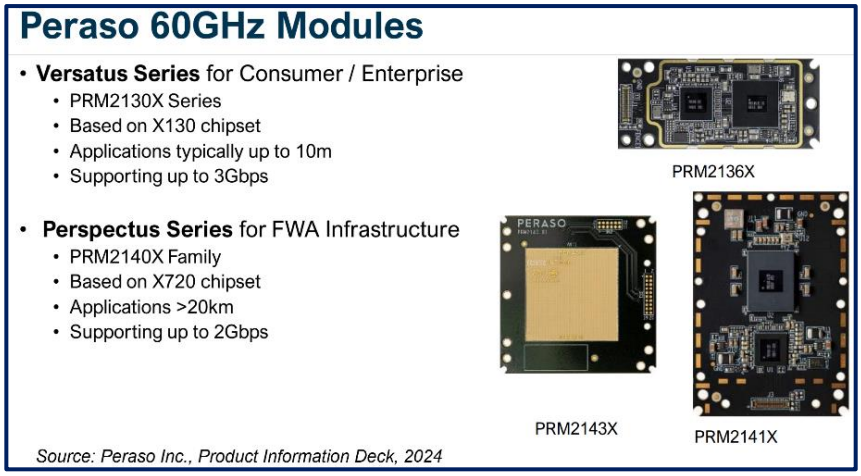
mmWave circuits are notoriously sensitive to slight variations in the semiconductor manufacturing processes. Peraso has resolved these issues and now reliably manufactures and ships a family of mmWave products in volume. The Peraso product line is pictured below and consists primarily of ICs, software, and mmWave modules



focused on the utilization of the unlicensed 60 GHz spectrum. More precisely the product line is further divided between the Fixed Wireless Access market and the ultra-short distance military and consumer market opportunities. The company also currently sells a line of high-density SRAM memory ICs that came with the MoSys merger.

60 GHz Products

Peraso has developed two chipsets/modules (see image below) for use in the 60 GHz



spectrum. These products include the Versatus Series and the Perspectus Series. The Verastus line is designed for communication connections of up to 10 meters and provides users with low-latency (< 5ms), un-congested spectrum, and huge bandwidth for high resolution, Independent, and stand-alone operations. This product module is well-suited for

- **Video:** Wireless conference room cameras and unwired remote display
- **Military:** Secure short-range military field networks
- **Transportation Safety**: Communication between vehicles and traffic monitoring cameras eliminates blind-spot hazards
- **Smart City**: CCTV connectivity
- **Smart Factory**: Robot and machine control
- **Railways:** Train-to-Station. Car-to-Car, and Train-to-APs along track

The Perspectus product line is designed for Fixed Wireless Access use by Wireless ISPs in place of satellite or traditional cable/fiber broadband delivery. The Perspectus ICs provide an excellent solution for providing high-speed internet access in areas where wired infrastructure is too expensive or impractical. To provide a less costly and improved ease-of-use product, Peraso offers a family of modules that integrate the company's beam-forming ICs with Peraso's own mmWave phased-array antennas (see the image below). The four modules are designed for different use cases

PRM2140X Module Family

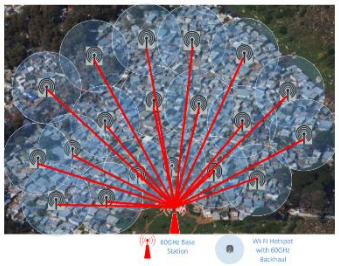
	PRM2141X	PRM2142X	PRM2143X	PRM2144X
Antenna Array	16-element patch array	32-element patch array	64-element patch array	128-element patch array
Max EIRP[1]	37 dBm	40 dBm[3]	40 dBm[3]	40 dBm[3]
Antenna Gain	15 dBi	18 dBi	22 dBi	25.4 dBi
Scan range[2]	±45° azimuth ±45° elevation	±45° azimuth ±20° elevation	±15° azimuth ±15° elevation	±10° azimuth ±20° elevation
Power consumption	Tx: 7-11.5 W Rx: 4.5 W	Tx: 11.5 W Rx: 4.5 W	Tx: 11.5 W Rx: 4.5 W	Tx: 11.5 W Rx: 4.5 W
Size	35mm × 50mm	50mm × 50mm	50mm × 50mm	55mm × 55mm
Additional information	Dish (reflector) antenna supported	Higher gain for AP in PtMP configuration	Higher gain for STA in PtMP configuration	Highest gain for STA or PtP.

depending on the distance needed between the transmitter terminal and the end customer premises. This Fixed Wireless solution is ideal for many local geographies where customer density or distances make fiber installations impractical. mmWave installations are particularly useful in dense urban areas and Peraso has developed the "DUNE" platform specifically designed for a Dense Urban Network Environment (see image below). The company has a current customer deploying this solution in

'DUNE' Platform for Fixed Wireless Access

Platform designed for Dense Urban Network Environment ("DUNE")

- Integrated HW/SW solution provides full suite of capabilities
  - Utilizes Peraso's PERSPECTUS series mmWave module
  - Dynamic traffic management and adaptive load balancing
  - Network isolation enables coexisting overlapping networks
- Performance Highlights
  - Multi-gigabit connectivity with extremely low latency
  - Up to 48% increase in Point-to-Multipoint network capacity
  - Power over ethernet with battery backup
- Expanded market opportunity
  - Received first commercial order in Jan. '24
  - Proof-of-concepts with multiple additional service providers



Source: Peraso, Inc. Investor Presentation, April 2024.

neighborhoods in South Africa.

DUNE is the result of a decade of experience in mmWave technology and in-house intellectual property directed at media access control, controlling the hardware, the physical layer, the physical connection, and software drivers, as well as Peraso's novel antenna designs and beamforming algorithms. DUNE takes a multi-level approach to reducing network wave contention and interference by incorporating antenna, beamforming, and protocol-level innovations.

5G

Peraso has an additional product line addressing the 5G mmWave opportunity. Given the company's extensive experience with mmWave technologies, 5G mmWave is a logical adjacent and potentially larger market. Peraso has commenced sampling a highly integrated 5G mmWave beamforming IC, which operates from the 24 GHz to 43 GHz frequency range and supports dual-stream multiple input, and multiple output, with two 16-channel beamforming arrays. Peraso's 5G technology enables higher-speed, low-latency communication and could be more cost-effective in supporting applications like ultra-fast internet, IoT, and more. Though this product line is not

contributing to revenue at present, we anticipate that in future quarters as Sub 6GHz spectrum becomes unavailable, this technology could become more important in ISPs.

Memory

Since the merger with Mosys, Peraso has sold a line of memory products targeted for high-performance applications where throughput is critical. These products integrate a proprietary, 1T-SRAM high-density embedded memory and a serial interface protocol resulting in a monolithic memory IC solution optimized for memory bandwidth and transaction access performance. Taiwan Semiconductor Manufacturing Corporation is the sole foundry that manufactures the wafers used to produce the Peraso memory IC products. TSMC has announced the discontinuation of the foundry process used to produce wafers. As a result, in May 2023, Peraso initiated an end-of-life (EOL) of the memory IC products. Under this EOL plan, the company now expects shipments of the memory products to continue through Q1 2025. However, the timing of EOL shipments will depend on future receipts of purchase orders from customers, deliveries from suppliers, and the delivery schedules requested by customers. As of March 1, 2024, Peraso had received EOL purchase orders totaling approximately $14.0 million, of which $3.7 million were shipped during 2023.

Competition

mmWave circuit and system design is a highly specialized engineering expertise, as mmWave ICs are challenging to design, manufacture, and ship at commercial scale. At frequencies above 24 GHz, these circuits are extremely vulnerable to small variances in the manufacturing process. Designing circuits that minimize susceptibility to these variances has required years of development, and we believe Peraso is one of the very few companies in the world with the required mmWave design expertise. Additionally, Peraso has already shipped mmWave devices at scale, with the assurance that all devices sold adhere to strict performance standards. The company has also developed its own mmWave phased-array antenna technology, providing an added highly competitive advantage for customers in terms of overall system cost as Peraso's customers can eliminate the additional cost of a third-party antenna.

The company believes that the only other entity that is currently able to ship mmWave silicon products for the unlicensed IEEE 802.11ad/ay is Qualcomm. Peraso's primary advantage in this specific market is its support of higher frequency bands from 66 GHz to 71 GHz. The advantage at these frequencies is that oxygen attenuation is significantly reduced, and broadband signals can travel much further. Peraso also competes well with Qualcomm in wireless video devices as the company has USB 3.0 built into its devices, providing ready support for USB architectures. Prime examples of the wireless replacement of a USB cable using the Peraso technology include USB web cams, wireless displays, and AR/VR headsets. Peraso believes that with its proprietary software resources there is no other mmWave vendor in the world that can offer multi-gigabit solutions as a replacement for wired USB.

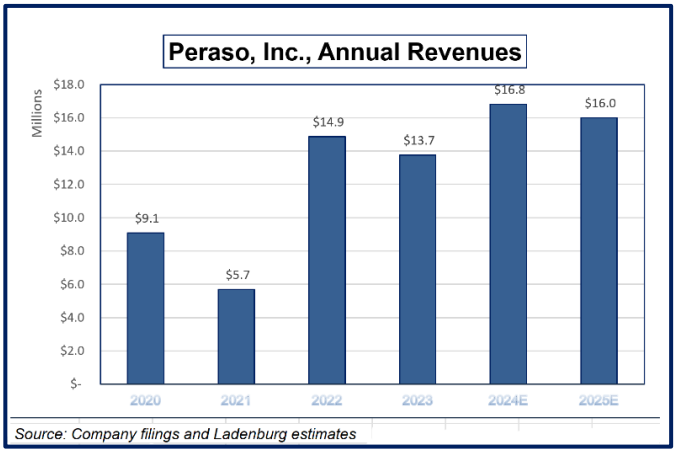
Financial Discussion

As a young pre-revenue company participating in an emerging sector of wireless communications, Peraso initially financed its operations primarily through venture capital channels in Canada. With the business combination with Mosys in 2021, the newly combined company ended the year with a cash balance of roughly $15 million.

To support ongoing growth initiatives the company completed a $2.4 million capital raise in November 2022, selling 2.4 million shares at $1.00/share. Again in May 2023, the company raised an additional $4 million with the sale of 5.7 million shares at $0.70 per share. After solid year/year revenue growth in the mmWave product lines through Q1 2023, in the second quarter of 2023 the company experienced a marked slowdown in revenues resulting from a significant inventory correction with its larger mmWave customers. This inventory issue persisted through the end of 2023 and into early 2024. As a result of the unexpected decline in revenues through 2023, the company's cash burn was larger than anticipated, negatively affecting the company's resources and share price. The resulting need for growth financing and the share price trading well below the required $1.00 level, the company executed a 40 for-1 reverse stock split late in 2023 and then completed an equity raise selling 480,000

shares of common stock, pre-funded warrants to purchase up to 1,424,760 shares of common stock. This offering provided the company with $4 million of new capital ex underwriting fees. The units also included Series A warrants and Series B warrants[11]. In total, the offering raised $4 million of new capital ex the underwriting fees. With the reverse stock split and the February 2024 capital raise the company now has roughly 2.7 million shares outstanding, however, on a fully diluted basis (including the A and B Series warrants) the share count is roughly 11 million.

After the merger with Mosys in 2021, the company had two business lines, memory and mmWave. The strategy was always to manage the memory business as a cash cow and focus on the mmWave segment as the future growth engine. Unfortunately, the mmWave segment experienced a rather significant sales slump due to an inventory correction issue with its two largest customers. This issue caused the decline in revenues experienced in 2023 and will likely continue to negatively impact revenues through mid-2024 (see the chart above). Additionally, the memory product line has entered an End-of-Life phase as the semiconductor fab producing these products is terminating the manufacturing line. As a result, we anticipate a loss of roughly $9 to $10 in revenues during 2025. Our 2025 revenue estimate of $16 million is flat with 2024 but includes a notable ramp (160% year/year) in mmWave revenues and make up for most of the lost memory revenues in 2025.



Valuation

The current market capitalization of Peraso is roughly $3 million (with a current share count of 2.7 million) with about $4 million in cash. This market cap number equates to a market cap-to-sales multiple of just 0.4X based on our 2025 estimated revenues of $16 million. We believe that this modest valuation is primarily the result of a general lack of awareness of the company's emergence as a leader in the expanding mmWave silicon market space. With the focus on WFA, consumer, and military markets Peraso is well positioned to generate impressive top-line growth into 2025 and beyond. We argue that given the expected growth and the fact that the company has limited competition in the mmWave market, the valuation should move more in line with other successful fabless semiconductor enterprises.

We believe a fair yet conservative valuation for the company today would be a Price/Sales ratio of 3X on our 2025 revenue estimate of $16 million discounted back to the present at 20%. This calculation equates to a fair value of approximately $3.75. In our view, this valuation accounts for the inherent risks generally associated with managing a relatively small company, but also factors in the dynamic growth metrics within the relatively new mmWave market.

Investment Risks

Peraso, Inc., has only been a public entity since the merger with Mosys, Inc., in 2021, and currently has a very modest market cap of roughly $3 million. This small market

[11] The Series A warrants allow for the purchase of up to 3,809,520 shares of common stock with an exercise price of $2.25 and an expiration date of February 2029. The Series B warrants allow for the purchase of up to 3,809,520 shares of common stock with an exercise price of $2.25 and an expiration date of August 2024.

valuation is due in large part to a significant interruption in revenue growth resulting from an ongoing inventory correction at its largest customers. In our opinion, the primary risks to our investment thesis lie in the company's ability to scale the use of its mmWave products in the FWA and 5G markets space. Other risk factors to our investment thesis include, but are not limited to, the following:

- **Customer Concentration:** Peraso's revenue has been highly concentrated, with a few customers accounting for a significant percentage of total revenue. For the years ended December 31, 2023, and 2022, the three largest customers represented approximately 75% and 63% of total revenue, respectively. We expect that a relatively small number of customers will continue to account for a substantial portion of total revenues for the foreseeable future. As a result, operations could be adversely affected by the decision of a single key customer to ether cease the use of the company's products or by selling fewer products that incorporate the Peraso technology.
- **Memory Chip End-of-Life:** Peraso intends to discontinue the production of the memory products as TSMC (the sole foundry) will be discontinuing the foundry process used to produce the memory ICs. As a result, the company has initiated an end-of-life process for these IC products and anticipates fulfilling EOL orders at least through December 31, 2024. These memory IC products represented more than 60% of revenues for the year ended December 31, 2023. The discontinuation of the production and sale of our memory IC products will negatively impact future revenues, results of operations, and cash flows.
- **Sales Cycle:** The design win process for Peraso's products is generally lengthy, expensive, and competitive, with no guarantee of future revenues. Winning a design requires both design and development costs and substantial engineering resources. These efforts and costs may never result in product sales and/or provide sufficient revenues to produce a positive ROI.
- **Future Technology Development:** The company's future failure to continue to develop new and competitive products on a timely basis would likely diminish its ability to attract and retain customers and negatively impact future revenue growth.
- **Contract Manufacturing:** Peraso depends on contract manufacturers (semiconductor fabs) for a significant portion of revenues. Many current and prospective OEM customers use third-party contract manufacturers to manufacture their systems. If Peraso is unable to compete effectively for the business of these contract manufacturers, its revenue and business operations could be adversely affected.
- **Intellectual Property:** The company's existing patents might not provide sufficient protection for the integral IP and the ongoing patent applications might not result in the issuance of patents. Either of these outcomes could reduce the value of the core technology and negatively impact the current competitive position and future business operations.
- **Semiconductor Cyclicality:** The semiconductor sector is subject to periodic downturns (at times for sustained periods). As a result, Peraso's business has in the past and could be adversely affected in the future by an industry downturn which could negatively impact future revenue generation and profitability.
- **Competition:** The existing and potential markets for mmWave silicon are characterized by ever-increasing performance requirements, evolving industry standards, rapid technological change, and product obsolescence. These characteristics lead to periodic changes in customer requirements, shorter product life cycles, and changes in industry demands. To remain competitive, Peraso needs to continue to enhance and evolve its products and the underlying proprietary technologies. The failure to keep ahead of evolving technological improvement and develop future products that achieve broad market acceptance would harm the company's competitive position and impede future growth.
- **Internet Usage:** The company is dependent on the continued popularity and demand of the Internet (and increasing bandwidth) for both business and personal use. Any disruption in this current paradigm would likely hinder the demand for the company's products along with its future revenue growth and profitability.
- **Governmental Regulation:** The company's products are designed for use in both licensed and unlicensed bandwidths. Failure to comply with federal, state, and international regulations and restrictions on the use of these frequency

spectrums, or the expansion of current or the enactment of new regulations, could adversely affect product sales and overall operations.

- **History of Losses:** The company has had an uneven history of operating profits/losses and there are no assurances that the company will be able to consistently generate positive net income in future periods. Continued operating losses could negatively impact the share price and require the need for additional capital.
- **Additional Equity Raises:** The company may need to raise additional capital in the future which could result in significant equity dilution for the current shareholders and negatively impact the share price.
- **Memory Products:** The company intends to discontinue the sale of its memory products which will cause a downturn in revenues and could materially affect cash flow and operations.
- **Small Cap Reporting Company:** The company is a "smaller reporting company" and, as a result of the reduced disclosure and governance requirements applicable to smaller reporting companies, the company's common stock may be less attractive to investors.

Peraso Management Team

Ronald Glibbery – *CEO, Co-Founder*

Mr. Glibbery leads all functional areas of Peraso Inc. and has served as chief executive officer since December 2021. He co-founded Peraso Technologies Inc. in 2009 and previously served as its chief executive officer. Prior to co-founding Peraso Technologies, Mr. Glibbery was President of Intellon, a pioneer and leader in the development of semiconductor devices used for powerline communications. Previously, Mr. Glibbery was a member of the management team of LSI Logic, Canada. Mr. Glibbery holds a B.E.Sc. in Electrical and Electronics Engineering from the University of Western Ontario.

James Sullivan – *CFO*

Mr. Sullivan is responsible for all financial aspects of Peraso Inc. and previously served as chief financial officer of MoSys since 2008. Prior to joining MoSys, he was the chief financial officer for Apptera, a provider of technology for voice advertising, search and commerce. Mr. Sullivan also served as chief financial officer for 8×8, a SAAS provider of VoIP and unified communication solutions. Mr. Sullivan held prior leadership roles at Netergy Microelectronics, a subsidiary of 8×8, and PWC. Mr. Sullivan holds a B.S. in Accounting from New York University, Stern School of Business, and is a certified public accountant.

Mark Lunsford – *Chief Revenue Officer*

Mr. Lunsford is responsible for all revenue growth aspects of Peraso Inc. and has served as chief revenue officer since October 2022. Prior to joining Peraso, he was VP of Global Sales at Chasm Advanced Materials. Mr. Lunsford also served as the EVP of worldwide sales at SiTime where he focused on expanding the adoption of MEMS-based timing devices. Mr. Lunsford previously held leadership roles at NXP, Micrel Semiconductor, Broadcom Corp (AVG), and AMD. He holds a B.S. degree in Mechanical Engineering from the University of California at Davis.

Brad Lynch – *Chief Operating Officer*

Mr. Lynch is responsible for all operational aspects of Peraso Inc. and has served as chief operating officer since December 2021. He co-founded Peraso Technologies in 2009 and served as executive vice president of engineering and operations. Prior to founding Peraso Technologies, Mr. Lynch worked as a system architect at Kleer Semiconductor, a fabless company focused on wireless audio technology. Before Kleer, he was director of software engineering at Intellon Corporation, a pioneer and leader in the development of semiconductor devices used for powerline communications. Previously, Mr. Lynch held various technical roles at Cogency Semiconductor and Power Trunk. Mr. Lynch holds a B.A.Sc in Computer Engineering from the University of Waterloo.

Table 1: Peraso, Inc. Quarterly Income Statement

QUARTERLY INCOME STATEMENT (000's except per share amounts)												
	CY 2022				CY Ending 2023				CY Ending 2024E			
	3/31/2022	6/30/2022	9/30/2022	12/30/2022	3/31/2023	6/30/2023	9/30/2023	12/31/2023	3/31/2024	6/30/2024E	9/30/2024E	12/31/2024E
mmWave	*1,296*	*2,248*	*1,312*	*1,621*	*2,707*	*619*	*878*	*203*	*293*	*750*	*1,250*	*2,500*
Memory Revenve	*1,908*	*1,872*	*1,748*	*2,194*	*2,181*	*1,616*	*3,384*	*1,265*	*2,383*	*3,000*	*3,000*	*3,000*
Royalty and other	*199*	*164*	*234*	*72*	*145*	*168*	*219*	*364*	*140*	*200*	*200*	*100*
Total Revenue	**$ 3,403**	**$ 4,284**	**$ 3,294**	**$ 3,887**	**$ 5,033**	**$ 2,403**	**$ 4,481**	**$ 1,832**	**$ 2,816**	**$ 3,950**	**$ 4,450**	**$ 5,600**
Cost of Sales	**$ 1,948**	**$ 2,799**	**$ 2,000**	**$ 2,168**	**$ 3,106**	**$ 1,795**	**$ 2,445**	**$ 4,531**	**$ 1,510**	**$ 2,100**	**$ 2,300**	**$ 2,900**
Gross Profit	**$ 1,455**	**$ 1,485**	**$ 1,294**	**$ 1,719**	**$ 1,927**	**$ 608**	**$ 2,036**	**$ (2,699)**	**$ 1,306**	**$ 1,850**	**$ 2,150**	**$ 2,700**
Operating expenses:												
Research and development	*5,486*	*5,643*	*4,509*	*4,130*	*3,887*	*3,668*	*3,484*	*3,359*	*2,835*	*3,000*	*3,050*	*3,100*
Selling, general and administrative	*2,705*	*2,878*	*3,353*	*2,172*	*2,242*	*1,977*	*2,112*	*2,174*	*2,102*	*2,125*	*2,125*	*2,200*
Gain on license and asset sale	-	-	*(2,557)*		*(406)*	-	-	-	-			
Impairment of goodwill	-	-	-	*9,946*	-	-	-	-	-	-	-	-
Total Operating Expenses	**$ 8,191**	**$ 8,521**	**$ 5,305**	**$ 16,248**	**$ 5,723**	**$ 5,645**	**$ 5,596**	**$ 5,533**	**$ 4,937**	**$ 5,125**	**$ 5,175**	**$ 5,300**
Operating Profit (Loss)	**$ (6,736)**	**$ (7,036)**	**$ (4,011)**	**$ (14,529)**	**$ (3,796)**	**$ (5,037)**	**$ (3,560)**	**$ (8,232)**	**$ (3,631)**	**$ (3,275)**	**$ (3,025)**	**$ (2,600)**
Other income (expense):												
Change in fair value of warrant liability	-	-	-	-	*658*	*966*	*2,615*	*(746)*	*1,591*	-	-	-
Expenses related to conversion of Preferred C	-	-	-	-	-	-	-	-	-	-	-	-
Interest and other income	*(18.0)*	*(7.0)*	*3.0*	*(64.0)*	*(10)*	*(15)*	*322*	*40*	*9*	*25*	*20*	*20*
Income Before Income Tax Provision	**$ (6,754)**	**$ (7,043)**	**$ (4,008)**	**$ (14,593)**	**$ (3,148)**	**$ (4,086)**	**$ (623)**	**$ (8,938)**	**$ (2,031)**	**$ (3,250)**	**$ (3,005)**	**$ (2,580)**
Income tax provision (benefit)	-	-	-	-	-	-	-	-	-	-	-	-
Net Income (Loss)	**$ (6,754)**	**$ (7,043)**	**$ (4,008)**	**$ (14,593)**	**$ (3,148)**	**$ (4,086)**	**$ (623)**	**$ (8,938)**	**$ (2,031)**	**$ (3,250)**	**$ (3,005)**	**$ (2,580)**
Weighted Average Shares Outstanding	19,769	21,636	20,039	20,534	21,561	24,338	28,589	716	1,907	2,700	2,700	2,700
EPS - fully diluted	**$ (0.34)**	**$ (0.33)**	**$ (0.20)**	**$ (0.71)**	**$ (0.15)**	**$ (0.17)**	**$ (0.02)**	**$ (12.48)**	**$ (1.07)**	**$ (1.20)**	**$ (1.11)**	**$ (0.96)**
Depreciation and amortization	*776.0*	*762.0*	*750.0*	*768.0*	*694*	*958*	*1,051*	*1,279*	*992*	*1,225*	*1,225*	*1,250*
Stock-based compensation	*1,171.0*	*1,739.0*	*1,447.0*	*1,373.0*	*1,307*	*1,319*	*1,308*	*1,047*	*1,222*	*1,050*	*1,100*	*1,150*
Other one time charges	*(18.0)*	*(1.0)*	*8.0*	*(78.0)*	*(4)*	*(9)*	*327*	*4*	*13*			
Non-GAAP Cash Earnings	**$ (4,825)**	**$ (4,543)**	**$ (1,803)**	**$ (2,584)**	**$ (1,809)**	**$ (2,784)**	**$ (552)**	**$ (5,862)**	**$ (1,395)**	**$ (975)**	**$ (680)**	**$ (180)**
Non-GAAP Cash Earnings Per Share	**$ (0.24)**	**$ (0.21)**	**$ (0.09)**	**$ (0.13)**	**$ (0.08)**	**$ (0.11)**	**$ (0.02)**	**$ (8.19)**	**$ (0.73)**	**$ (0.36)**	**$ (0.25)**	**$ (0.07)**
EBITDA	**$ (4,807)**	**$ (4,536)**	**$ (1,806)**	**$ (2,520)**	**$ (1,799)**	**$ (2,769)**	**$ (874)**	**$ (5,902)**	**$ (1,404)**	**$ (1,000)**	**$ (700)**	**$ (200)**
% of TOTAL REVENUE												
Gross Profit	**42.8%**	**34.7%**	**39.3%**	**44.2%**	**38.3%**	**25.3%**	**45.4%**	**-147.3%**	**46.4%**	**46.8%**	**48.3%**	**48.2%**
Research and development	161.2%	131.7%	136.9%	106.3%	77.2%	152.6%	77.8%	183.4%	100.7%	75.9%	68.5%	55.4%
Selling, general, and administration	79.5%	67.2%	101.8%	55.9%	44.5%	82.3%	47.1%	118.7%	74.6%	53.8%	47.8%	39.3%
Total Operating Expenses	**240.7%**	**198.9%**	**161.1%**	**418.0%**	**113.7%**	**234.9%**	**124.9%**	**302.0%**	**175.3%**	**129.7%**	**116.3%**	**94.6%**
Operating Profit (Loss)	**-197.9%**	**-164.2%**	**-121.8%**	**-373.8%**	**-75.4%**	**-209.6%**	**-79.4%**	**-449.3%**	**-128.9%**	**-82.9%**	**-68.0%**	**-46.4%**
Net Income (Loss)	**-198.5%**	**-164.4%**	**-121.7%**	**-375.4%**	**-62.5%**	**-170.0%**	**-13.9%**	**-487.9%**	**-72.1%**	**-82.3%**	**-67.5%**	**-46.1%**
% YEAR OVER YEAR INCREASE												
Total Revenue	**87156.4%**	**40700.0%**	**25634.4%**	**27664.3%**	**47.9%**	**-43.9%**	**36.0%**	**-52.9%**	**-44.0%**	**64.4%**	**-0.7%**	**205.7%**
Gross Profit	**-2639.3%**	**-5992.9%**	**-920.0%**	**-1238.4%**	**32.4%**	**-59.1%**	**57.3%**	**-257.0%**	**-32.2%**	**204.3%**	**5.6%**	**-200.0%**
Total Operating Expenses	**434.4%**	**326.6%**	**103.4%**	**496.9%**	**-30.1%**	**-33.8%**	**5.5%**	**-65.9%**	**-13.7%**	**-9.2%**	**-7.5%**	**-4.2%**
Operating Profit (Loss)	**323.6%**	**247.9%**	**45.0%**	**405.7%**	**-43.6%**	**-28.4%**	**-11.2%**	**-43.3%**	**-4.3%**	**-35.0%**	**-15.0%**	**-68.4%**
Net Income (Loss)	**323.6%**	**258.8%**	**50.9%**	**424.9%**	**-53.4%**	**-42.0%**	**-84.5%**	**-38.8%**	**-35.5%**	**-20.5%**	**382.3%**	**-71.1%**
Non-GAAP Cash Earnings	**254.1%**	**187.2%**	**-17.1%**	**11.9%**	**-62.5%**	**-38.7%**	**-69.4%**	**126.9%**	**-22.9%**	**-65.0%**	**23.2%**	**-96.9%**
% SEQUENTIAL INCREASE												
Total Revenue	**24207.1%**	**25.9%**	**-23.1%**	**18.0%**	**29.5%**	**-52.3%**	**86.5%**	**-59.1%**	**53.7%**	**40.3%**	**12.7%**	**25.8%**
Gross Profit	**-1063.6%**	**2.1%**	**-12.9%**	**32.8%**	**12.1%**	**-68.4%**	**234.9%**	**-232.6%**	**-148.4%**	**41.7%**	**16.2%**	**25.6%**
Total Operating Expenses	**200.9%**	**4.0%**	**-37.7%**	**206.3%**	**-64.8%**	**-1.4%**	**-0.9%**	**-1.1%**	**-10.8%**	**3.8%**	**1.0%**	**2.4%**
Operating Profit (Loss)	**134.5%**	**4.5%**	**-43.0%**	**262.2%**	**-73.9%**	**32.7%**	**-29.3%**	**131.2%**	**-55.9%**	**-9.8%**	**-7.6%**	**-14.0%**
Net Income (Loss)	**142.9%**	**4.3%**	**-43.1%**	**264.1%**	**-78.4%**	**29.8%**	**-84.8%**	**1334.7%**	**-77.3%**	**60.0%**	**-7.5%**	**-14.1%**
Non-GAAP Cash Earnings	**109.0%**	**-5.8%**	**-60.3%**	**43.3%**	**-30.0%**	**53.9%**	**-80.2%**	**962.0%**	**-76.2%**	**-30.1%**	**-30.3%**	**-73.5%**

Source: Ladenburg Thalmann Estimates and Company Filings

Table 2: Peraso, Inc. Annual Income Statement

ANNUAL INCOME STATEMENTS (000's except per share amounts)						
	2020	2021	2022	2023	2024E	2025E
mmWave	*1,540.0*	*4,906.0*	*6,477*	*4,407*	*4,793*	*12,500*
Memory Revenve			*7,722*	*8,446*	*11,383*	*3,000*
Royalty and other	*7,550.0*	*773.0*	*669*	*896*	*640*	*500*
Total Revenue	**$ 9,090**	**$ 5,679**	**$ 14,868**	**$ 13,749**	**$ 16,816**	**$ 16,000**
Cost of Sales	**$ 1,748**	**$ 3,270**	**$ 8,915**	**$ 11,877**	**$ 8,810**	**$ 8,500**
Gross Profit	**$ 7,342**	**$ 2,409**	**$ 5,953**	**$ 1,872**	**$ 8,006**	**$ 7,500**
Operating expenses:						
Research and development	*8,289*	*11,471*	*19,768*	*14,398*	*11,985*	*12,400*
Selling, general and administrative	*7,198*	*7,016*	*11,108*	*8,505*	*8,552*	*8,500*
Gain on license and asset sale	*-*	*-*	*(2,557)*	*(406)*	*-*	*-*
Impairment of goodwill	*-*	*-*	*9,946*	*-*	*-*	*-*
Total Operating Expenses	**$ 15,487.0**	**$ 18,487.0**	**$ 38,265.0**	**$ 22,497.0**	**$ 20,537.0**	**$ 20,900.0**
Operating Profit (Loss)	**$ (8,145.0)**	**$(16,078.0)**	**$(32,312.0)**	**$(20,625.0)**	**$ (12,531.0)**	**$ (13,400.0)**
Other income (expense):						
Change in fair value of warrant liability	*-*	*-*	*-*	*3,493*	*-*	*-*
Expenses related to conversion of Preferred C	*(5,044)*					
Interest and other income	*(2,082)*	*5,167*	*(86)*	*337*	*74*	*-*
Income Before Income Tax Provision	**$(15,271.0)**	**$(10,911.0)**	**$(32,398.0)**	**$(16,795.0)**	**$ (12,457.0)**	**$ (13,400.0)**
Income tax provision (benefit)	*-*	*-*	*-*	*-*	*-*	*-*
Net Income (Loss)	**$ (15,271)**	**$ (10,911)**	**$ (32,398)**	**$ (16,795)**	**$ (12,457)**	**$ (13,400)**
Weighted Average Shares Outstanding	4,242	5,869	20,500	1,310	2,300	11,000
EPS - fully diluted	**$ (3.60)**	**$ (1.86)**	**$ (1.58)**	**$ (12.82)**	**$ (5.42)**	**$ (1.22)**
Depreciation and amortization	*1,436*	*1,115*	*3,056*	*3,982*	*4,692*	*4,500*
Stock-based compensation	*1,711*	*4,473*	*5,730*	*4,981*	*4,522*	*5,000*
Other one time charges	*(77)*	*1,672*	*(89)*	*318*	$ 13	
Non-GAAP Cash Earnings	**$ (12,201)**	**$ (3,651)**	**$ (13,755)**	**$ (11,007)**	**$ (3,230)**	**$ (3,900)**
Non-GAAP Cash Earnings Per Share	**$ (2.88)**	**$ (0.62)**	**$ (0.67)**	**$ (8.40)**	**$ (1.40)**	**$ (0.35)**
EBTDA	**$ (5,075)**	**$ (8,818)**	**$ (13,669)**	**$ (11,344)**	**$ (3,317)**	**$ (3,900)**
% of TOTAL REVENUE						
Gross Profit	**80.8%**	**42.4%**	**40.0%**	**13.6%**	**47.6%**	**46.9%**
Research and development	91.2%	202.0%	133.0%	104.7%	71.3%	77.5%
Selling, general, and administration	79.2%	123.5%	74.7%	61.9%	50.9%	53.1%
Total Operating Expenses	**170.4%**	**325.5%**	**257.4%**	**163.6%**	122.1%	130.6%
Operating Profit (Loss)	**-89.6%**	**-283.1%**	**-217.3%**	**-150.0%**	-74.5%	-83.8%
Net Income (Loss)	**-168.0%**	**-192.1%**	**-217.9%**	**-122.2%**	-74.1%	-83.8%
% YEAR OVER YEAR INCREASE						
Total Revenue	**NM**	**-37.5%**	**161.8%**	**-7.5%**	22.3%	-4.9%
Gross Profit	**NM**	**-67.2%**	**147.1%**	**-68.6%**	327.7%	-6.3%
Total Operating Expenses	**NM**	**19.4%**	**107.0%**	**-41.2%**	-8.7%	1.8%
Operating Profit (Loss)	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
Net Income (Loss)	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**
Non-GAAP Cash Earnings	**NM**	**NM**	**NM**	**NM**	**NM**	**NM**

Source: Ladenburg Thalmann Estimates and Company Filings

Table 3: Peraso, Inc. Balance Sheet

BALANCE SHEET (000's)								
	CY 2020	CY 2021	CY 2022	CY 2023				CY 2024
	12/31/2020	12/31/2021	12/31/2022	3/31/2023	6/30/2023	9/30/2023	12/31/2023	3/31/2024
ASSETS								
Current Assets:								
Cash and cash equivalents	1,712	15,160	2,906	1,392	2,740	689	1,583	2,435
Accounts receivable, net	922	2,436	3,244	2,881	1,497	3,064	731	1,482
Inventories	1,274	3,824	5,348	4,853	5,160	5,697	2,606	2,756
Tax credits & receivables	1,711	1,099	-	-	-	-	-	-
Deferred cost of net revenue	-	-	600	-	-	-	-	
Prepaid expenses and other current assets	963	1,159	615	742	729	780	620	785
Total current assets	**$ 6,582**	**$ 23,678**	**$ 12,713**	**$ 9,868**	**$ 10,126**	**$ 10,230**	**$ 5,540**	**$ 7,458**
Long-term investments	$ -	$ 2,928						
Property and equipment, net	2,621	2,349	2,225	2,078	1,850	1,624	1,156	981
Operating lease rights of use	731	617	1,147	986	820	647	615	524
Intangible assets, net	-	8,355	6,278	5,754	5,031	4,209	3,280	2,464
Goodwill	-	9,946	-	-	-	-	-	-
Other assets	53	78	123	122	123	121	123	121
Total assets	**$ 9,987**	**$ 47,951**	**$ 22,486**	**$ 18,808**	**$ 17,950**	**$ 16,831**	**$ 10,714**	**$ 11,548**
LIABILITIES AND STOCKHOLDERS' EQUITY								
Current Liabilities:								
Accounts payable	1,086	1,937	1,844	1,364	1,142	2,583	2,448	2,221
Deferred revenue	-	375	332	244	175	74	1,105	1,110
Short term lease liabilities	225	379	687	579	464	348	370	328
Loan facility	581	-	-	-	-	-	-	-
Accrued and other	456	2,903	1,817	1,366	1,161	689	611	748
Total current liabilities	**$ 2,348**	**$ 5,594**	**$ 4,680**	**$ 3,553**	**$ 2,942**	**$ 3,694**	**$ 4,534**	**$ 4,407**
Operating lease liabilities	532	288	470	404	348	379	349	277
Convertible debentures	4,322	-	-	-	-	-	-	-
Warrant liabilities	6,706	-	2,079	1,421	3,618	1,003	1,748	158
Total liabilities	**$ 13,908**	**$ 5,882**	**$ 7,229**	**$ 5,378**	**$ 6,908**	**$ 5,076**	**$ 6,631**	**$ 4,842**
Total stockholders' equity	**$ (3,921)**	**$ 42,069**	**$ 15,257**	**$ 13,430**	**$ 11,042**	**$ 11,755**	**$ 4,083**	**$ 6,706**
Total Liabilities and Stockholders' Equity	**$ 9,987**	**$ 47,951**	**$ 22,486**	**$ 18,808**	**$ 17,950**	**$ 16,831**	**$ 10,714**	**$ 11,548**

Source: Company Filings

APPENDIX A: IMPORTANT RESEARCH DISCLOSURES

ANALYST CERTIFICATION

I, Jon R. Hickman, attest that the views expressed in this research report accurately reflect my personal views about the subject security and issuer. Furthermore, no part of my compensation was, is, or will be directly or indirectly related to the specific recommendation or views expressed in this research report, provided, however, that:

The research analyst primarily responsible for the preparation of this research report has or will receive compensation based upon various factors, including the volume of trading at the firm in the subject security, as well as the firm's total revenues, a portion of which is generated by investment banking activities.

Additional information regarding the contents of this publication will be furnished upon request. Please contact Ladenburg Thalmann, Compliance Department, 640 Fifth Avenue, 4th floor, New York, New York 10019 (or call 212-409-2000) for any information regarding current disclosures, and where applicable, relevant price charts, in regard to companies that are the subject of this research report.

COMPANY BACKGROUND

Peraso, inc, is a fabless semiconductor company focused on the development and sale of mmWave semiconductor devices and antenna modules based on its proprietary semiconductor devices and non-recurring engineering, services and licensing of intellectual property. The company's primary focus is on the development of mmWave, which is generally described as the frequency bands from 24 Gigahertz, or GHz, to 300 GHz. The product line of mmWave products enables a range of applications including: multi-gigabit point-to-point, wireless links with a range of up to 25 kilometers and operating in the 60 GHz frequency band; multi-gigabit point-to-multi-point links in the 60 GHz frequency band used to provide fixed wireless access (FWA). The company also has silicon to provide FWA in the 5G operating bands from 24 GHz to 43 GHz to provide multi-gigabit capability and low latency connections; military communications; and consumer applications, such as high performance wireless video streaming and untethered augmented reality and virtual reality. The company is headquartered in California and trades on the NASDAQ under symbol "PRSO".

VALUATION METHODOLOGY

Our valuation is based on a Price/Sales ratio of 3X on our 2025 revenue estimate of $16 million discounted back to the present at 20%. This calculation equates to a fair value of approximately $3.75 with a fully diluted share count of 11 million.

RISKS

Peraso, Inc., has only been a public entity since the merger with Mosys, Inc., in 2021, and currently has a very modest market cap of roughly $3 million. This small market valuation is due in large part to a significant interruption in revenue growth resulting from an ongoing inventory correction at its largest customers. In our opinion, the primary risks to our investment thesis lie in the company's ability to scale the use of its mmWave products in the FWA and 5G markets space. Other risk factors to our investment thesis include, but are not limited to, the following:

- **Customer Concentration:** Peraso's revenue has been highly concentrated, with a few customers accounting for a significant percentage of total revenue. For the years ended December 31, 2023, and 2022, the three largest customers represented approximately 75% and 63% of total revenue, respectively. We expect that a relatively small number of customers will continue to account for a substantial portion of total revenues for the foreseeable future. As a result, operations could be adversely affected by the decision of a single key customer to either cease the use of the company's products or by selling fewer products that incorporate the Peraso technology.
- **Memory Chip End-of-Life:** Peraso intends to discontinue the production of the memory products as TSMC (the sole foundry) will be discontinuing the foundry process used to produce the memory ICs. As a result, the company has initiated an end-of-life process for these IC products and anticipates fulfilling EOL orders at least through December 31, 2024. These memory IC products represented more than 60% of revenues for the year ended December 31, 2023. The discontinuation of the production and sale of memory IC products will negatively impact future revenues, results of operations, and cash flows.
- **Sales Cycle:** The design win process for Peraso's products is generally lengthy, expensive, and competitive, with no guarantee of future revenues. Winning a design requires both design and development costs and substantial engineering resources. These efforts and costs may never result in product sales and/or provide sufficient revenues to produce a positive ROI.
- **Future Technology Development:** The company's future failure to continue to develop new and competitive products on a timely basis would likely diminish its ability to attract and retain customers and negatively impact future revenue growth.
- **Contract Manufacturing:** Peraso depends on contract manufacturers (semiconductor fabs) for a significant portion of revenues. Many current and prospective OEM customers use third-party contract manufacturers to manufacture their systems. If Peraso is unable to compete effectively for the business of these contract manufacturers, its revenue and business operations could be adversely affected.
- **Intellectual Property:** The company's existing patents might not provide sufficient protection for the integral IP and the ongoing patent applications might not result in the issuance of patents. Either of these outcomes could reduce the value of the core technology and negatively impact the current competitive position and future business operations.

- **Semiconductor Cyclicality:** The semiconductor sector is subject to periodic downturns (at times for sustained periods). As a result, Peraso's business has in the past and could be adversely affected in the future by an industry downturn which could negatively impact future revenue generation and profitability.
- **Competition:** The existing and potential markets for mmWave silicon are characterized by ever-increasing performance requirements, evolving industry standards, rapid technological change, and product obsolescence. These characteristics lead to periodic changes in customer requirements, shorter product life cycles, and changes in industry demands. To remain competitive, Peraso needs to continue to enhance and evolve its products and the underlying proprietary technologies. The failure to keep ahead of evolving technological improvement and develop future products that achieve broad market acceptance would harm the company's competitive position and impede future growth.
- **Internet Usage:** The company is dependent on the continued popularity and demand of the Internet (and increasing bandwidth) for both business and personal use. Any disruption in this current paradigm would likely hinder the demand for the company's products along with its future revenue growth and profitability.
- **Governmental Regulation:** The company's products are designed for use in both licensed and unlicensed bandwidths. Failure to comply with federal, state, and international regulations and restrictions on the use of these frequency spectrums, or the expansion of current or the enactment of new regulations, could adversely affect product sales and overall operations.
- **History of Losses:** The company has had an uneven history of operating profits/losses and there are no assurances that the company will be able to consistently generate positive net income in future periods. Continued operating losses could negatively impact the share price and require the need for additional capital.
- **Additional Equity Raises:** The company may need to raise additional capital in the future which could result in significant equity dilution for the current shareholders and negatively impact the share price.

STOCK RATING DEFINITIONS

Buy: The stock's return is expected to exceed 12.5% over the next twelve months.

Neutral: The stock's return is expected to be plus or minus 12.5% over the next twelve months.

Sell: The stock's return is expected to be negative 12.5% or more over the next twelve months.

Investment Ratings are determined by the ranges described above at the time of initiation of coverage, a change in risk, or a change in target price. At other times, the expected returns may fall outside of these ranges because of price movement and/or volatility. Such interim deviations from specified ranges will be permitted but will become subject to review.

RATINGS DISPERSION AND BANKING RELATIONSHIPS AS OF (June 12, 2024)

Rating	%	IB %
BUY	73.4	59.1
NEUTRAL	26.6	32.6
SELL	0.0	0.0

COMPANIES UNDER JON'S COVERAGE

Blade Air Mobility, Inc. (BLDE)
Byrna Technologies, Inc. (BYRN)
Chicken Soup for the Soul Entertainment, Inc. (CSSE)
IZEA, Inc. (IZEA)
Paysign, Inc. (PAYS)
Synchronoss Technologies, Inc. (SNCR)
SuRo Capital Corp. (SSSS)
Energous Corporation (WATT)
Bridgeline Digital, Inc. (BLIN)
Core Scientific, Inc. (CORZ)
Inuvo, Inc. (INUV)
LiveOne, Inc. (LVO)
Peraso, Inc. (PRSO)
SRAX, Inc. (SRAX)
Usio, Inc. (USIO)

COMPANY SPECIFIC DISCLOSURES

Ladenburg Thalmann & Co. Inc. has managed or co-managed a public offering for Peraso, Inc. within the past 12 months.

Ladenburg Thalmann & Co. Inc. intends to seek compensation for investment banking and/or advisory services from Peraso, Inc. within the next 3 months.

Ladenburg Thalmann & Co. Inc received compensation for investment banking services from Peraso, Inc. within the past 12 months.

Ladenburg Thalmann & Co. Inc had an investment banking relationship with Peraso, Inc. within the last 12 months.

Ladenburg Thalmann & Co. Inc. acted as Sole Book Running Manager in a securities offering for Peraso Inc (PRSO) in the last 12 months.

INVESTMENT RATING AND PRICE TARGET HISTORY

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