



## PRODUCT BRIEF

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# **EXTEND NETWORK RANGE & CAPACITY**

The broadest PtP millimeter wave offering

## The Ceragon family of PtP millimeter wave solutions

Millimeter wave (mmW) wireless transport is an attractive, lower-cost alternative to the traditional microwave (MW) technology for delivering high speed data for private network use cases, such as Fixed Wireless Access (FWA), Fiber Network Extension/Backup, Enterprise Multi-Gigabit Connectivity, Metro and Aggregation Networks, Multi-Dwelling Unit (MDU) Gigabit Broadband, in addition to backhaul transport. The use of E-band and V-Band overcomes the shortage of available spectrum on microwave frequencies, and delivers high-capacity, low latency transport at a lower cost. This combines to make mmW a strong alternative for a variety of scenarios that until recently could only be addressed by MW connectivity.

## LEVERAGING THE SPECTRUM

Deploying mmW technology in support of a variety of applications offers significant advantages, stemming primarily from its high-frequency spectrum. Leveraging this spectrum, mmW can transmit large amounts of data at a very high speed, a crucial capability in the age of 5G and IoT, where data demand is skyrocketing. For instance, in broadband communications, mmW can provide gigabit-level capacity, enabling seamless streaming of high-definition content. This is particularly beneficial in dense urban areas where space is at a premium. Furthermore, the high frequency also means that mmW has a large number of available bandwidths, which reduces the risk of network congestion,

### Reliability flexibility and flexible capacity

At Ceragon, we harness these strengths of mmW to deliver superior wireless transport solutions. Our advanced mmW systems, enhanced by the Siklu by Ceragon portfolio, are designed to address the key challenges of modern networks, providing high-capacity, reliable, and cost-effective connectivity, thus empowering our clients to stay ahead in the fast-evolving digital landscape. With our deep industry knowledge and technical expertise, we are not only meeting today's connectivity needs but also shaping the future of wireless communication.



SOLVING  
5G & IOT  
CAPACITY DEMANDS



## THE PRODUCTS

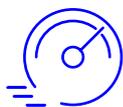


## MEET THE **MILLIMETRIC WAVE FAMILY** 1-20 Gbps capacity that meets your needs

Ceragon offers the broadest mmW portfolio in the industry, scaling from 1Gbps TDD capacity all the way up to 20Gbps FDD capacity, that is top-of-class in the market. The solutions are smaller and lighter than any other similar equipment, a fact that enables easier installation and faster deployment, helping to reduce operational costs. These innovative solutions consist of point to point links (in addition to our point to multi point line of products) that operate in the millimeter wave spectrum. We have the flexibility to meet your link requirements and link budget needs while delivering optimal bandwidth and modulation for your transport requirements.

The Ceragon mmW family successfully fulfills a wide range of scenarios. When mission-critical networks demand uninterrupted video streams, safe city sensor data, control and monitoring of utility IOT devices, or high capacity 5G access, we have a mmW solution that fits your needs. Whether you need unlicensed V-Band connections for short distances or ultra-high capacity, licensed E-Band frequencies, Ceragon's mmW family has a solution that provides a reliable network, including embedded AES encryption for optimal security.

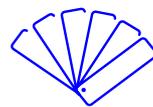
### Our mmW PtP family advantages



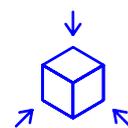
Multi-gigabit capacity



Abundant available spectrum



A Solution for any scenario



Small form factor and easy installation

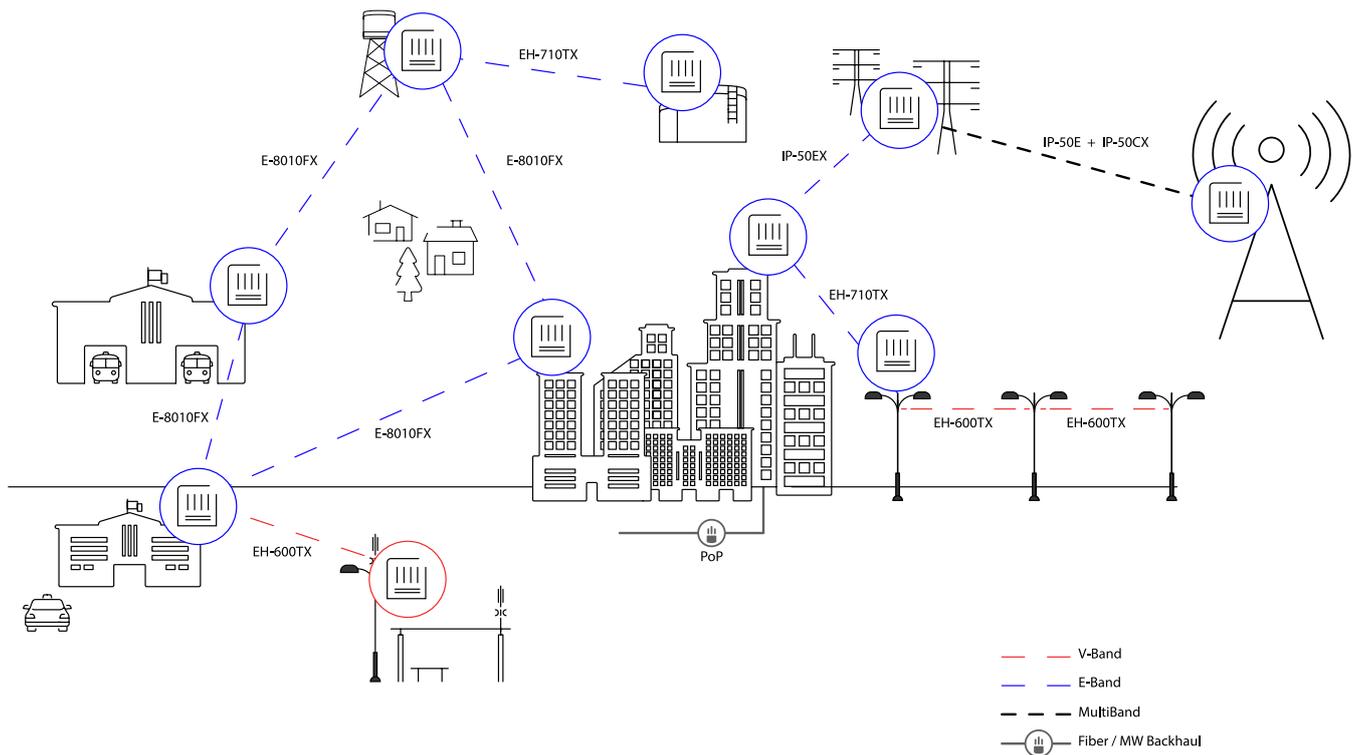


## THE PRODUCTS

# USE CASES

Millimeter wave (mmW) wireless supports a wide range of use cases, providing solutions for various private network needs such as, connecting IOT devices and facilities for utility companies, Wi-Fi backhauling & video surveillance for public safety, and multi-gigabit connectivity for business and educational campuses. Other scenarios include Fixed Wireless Access (FWA), fiber network extension/backup, and Multi-Dwelling Unit (MDU) Gigabit Broadband. Multiple Communication and Internet Service Provider scenarios, such as Metro and Aggregation Networks and backhaul transport, are also supported.

The following diagrams and product details provide an overview of the use case implementations enabled by our mmW portfolio which consist of our IP-50 and EtherHaul (EH\*) series of products.



## THE PRODUCTS



### **EtherHaul-614TX** High Reliability & Capacity V-Band Solution

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The EH-614TX delivers high-capacity, 1Gbps aggregated bandwidth, using 60GHz V-band technology. This compact, durable radio is engineered for a variety of use cases including smart cities, business broadband, Wi-Fi backhaul, fiber-to-the-home, and small cell connectivity.

Deployable on poles, light fixtures, and other street-level infrastructure, it perfectly blends into street scenery. The EH-614TX taps into the whole 60GHz spectrum from 57GHz to 68GHz and by utilizing the upper V-band frequencies, it achieves further reach and avoids signal loss from oxygen absorption.

As an unlicensed 60GHz solution, the EH-614TX Avoids interference with support for dense, frequency reuse networks. Its narrow beam antennas further reduce the risk of interference.

With an IP67 fully sealed design, the radio withstands harsh outdoor environments ranging from -45°C to +55°C. Its integrated all-silicon technology enhances reliability and reduces size and costs.

As the world's top-selling millimeter wave radio, the field-proven EH series from Ceragon delivers unmatched price-performance. This reinforces our innovative leadership in wireless connectivity.



**EASILY BLENDS  
INTO THE URBAN LANDSCAPE**

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## THE PRODUCTS

# EtherHaul-614TX Products Specifications

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## RADIO

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- 57-66GHz, TDD
- Max Capacity – 1 Gbps TDD
- Channel BW - 125/250/500MHz wide, 32/16/8 non-overlapping channels, QPSK ÷ QAM64
- Up to 5 levels of hitless adaptive bandwidth, coding, and modulation
- Boost gain by up to 25 dB

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## NETWORKING

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- IEEE 802.1d transparent bridging
- VLAN and VLAN stacking,
- 4K VLANs, MEF 9, 14 and 21 compliant Ethernet services,
- Smart Pipes Transparent Ports Mode
- Link aggregation: LAG and LACP (IEEE 802.3ad)
- Ethernet Ring Protection Switching:
  - ITU-T G.8032 ERPS Link state propagation
  - 16KB Jumbo frames
  - Configurable QOS-aware forwarding
- 8 level H-QoS with multi mapping options:
  - L2: 802.1p, VLAN id., L2½: MPLS EXP, L3: DSCP
- Security:
  - AES 128-bit and AES 256-bit encryption

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## INTERFACES

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- 1 x GE ports (RJ-45), POE IN
  - 2 x GE ports (RJ-45), POE OUT
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## THE PRODUCTS



### **EtherHaul-710TX** Our Compact E-Band Solution

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The EH-710TX, the smallest E-band radio in the market, provides cost-efficient 1Gbps TDD capacity and interference-free ethernet connectivity. Ideal for street-level and rooftop deployments, it operates over the uncongested E-band, making it applicable for various use cases, such as video surveillance, Wi-Fi backhaul, broadband services, campus connectivity, and mobile backhaul.

The palm-sized radio simplifies site acquisition and installation. It comes with a choice of antennas for varying ranges, a GbE switch, and dual PoE-out, enabling easy cascading of radios and powering of external devices.

The 70GHz spectrum it uses is uncongested, even in dense urban areas, offering easy spectrum acquisition. With high-gain antennas, abundant spectrum, low licensing fees, and quick acquisition procedures, the E-band utilizes channel availability and maximizes spectrum reuse.

The EH-710TX, field-proven with tens of thousands of successful deployments worldwide, can be installed without requiring telco expertise. With minimal deployment costs and virtually no maintenance, it offers exceptional value, minimizing total cost of ownership and often providing a return on investment measured in months.



**EASY TO INSTALL  
WITHOUT TELCO EXPERTISE**

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## THE PRODUCTS

# EtherHaul-710TX Products Specifications

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## RADIO

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- 71-76GHz
- Max Capacity – 1 Gbps TDD
- Channel BW - 125/250/500MHz wide, 32/16/8 non-overlapping channels, QPSK ÷ QAM64
- Up to 5 level of hitless adaptive bandwidth, coding, and modulation - boost gain by up to 25dB

## NETWORKING

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- IEEE 802.1d transparent bridging
- VLAN and VLAN stacking,
- 4K VLANs, MEF 9, 14 and 21 compliant Ethernet services,
- Smart Pipes Transparent Ports Mode
- Link aggregation: LAG and LACP (IEEE 802.3ad)
- Ethernet Ring Protection Switching:
  - ITU-T G.8032 ERPS Link state propagation
  - 16KB Jumbo frames
  - Configurable QOS-aware forwarding
- 8 level H-QoS with multi mapping options:
  - L2: 802.1p, VLAN id., L2½: MPLS EXP, L3: DSCP
- Security: AES 128-bit and AES 256-bit encryption

## INTERFACES

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- 1 x GE ports (RJ-45), POE IN
  - 2 x GE ports (RJ-45), POE OUT
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## THE PRODUCTS



### **EH-1200FX & EH-2500FX**

#### Superior Performance E-Band

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The EH-1200FX & EH-2500FX deliver full duplex connectivity at 1 Gbps and 2 Gbps respectively, making them great solutions for business broadband, Gigabit-to-the Home (GTTH), campus connectivity, and multi-megapixel video surveillance deployments. Both devices deliver an advanced wireless solution with uncongested connectivity over the 71-76/81-86GHz spectrum.

With pencil-thin beams, the EH-1200FX and EH-2500FX provide zero interference and high reliability. Both radios support up to 32 non-overlapping channels, making them an incredibly scalable solution for dense urban deployments where spectrum scarcity limits microwave options. In addition, the pairs' E-band capabilities offer the added benefit of low licensing fees and expedited approvals.

With an L2 switch, extra ports, and MEF-compliant integrated Carrier Ethernet features, the pair provides resilient topology implementation without any additional equipment, streamlining your overall operations.

Both all-outdoor radios have small footprints, ensuring easy site acquisition and quick installation. Built on Ceragon's advanced integrated-silicon technology, these compact and lightweight radios offer high reliability and an unbeatable price-to-throughput ratio, delivering significant value at a low Total Cost of Ownership (TCO).



**COMBINES HIGH-THROUGHPUT & LOW-LATENCY  
TO DELIVER EXCELLENT PERFORMANCE**

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## THE PRODUCTS

### EH-1200FX & EH-2500FX Products Specifications

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#### RADIO

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- 71-76/81-86GHz (Tx High and Low)
  - Max Capacity:
    - EH-1200FX | 1 Gbps FDD
    - EH-2500FX | 2 Gbps FDD
  - Channel BW:
    - EH-1200FX | 250/500MHz
    - EH-2500FX | Multiband 250/500/750/1250MHz
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#### NETWORKING

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- IEEE 802.1d transparent bridging
  - VLAN and VLAN stacking,
  - 4K VLANs, MEF 9, 14 and 21 compliant Ethernet services,
  - Smart Pipes Transparent Ports Mode
  - Link aggregation: LAG and LACP (IEEE 802.3ad)
  - Ethernet Ring Protection Switching:
    - ITU-T G.8032 ERPS Link state propagation
    - 16KB Jumbo frames
    - Configurable QOS-aware forwarding
  - 8 level H-QoS with multi mapping options:
    - L2: 802.1p, VLAN id., L2½: MPLS EXP, L3: DSCP
  - Security: AES 128-bit encryption
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#### INTERFACES

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- EH-1200FX
    - Aux
    - 2 x RJ-45 (Copper)
  - EH-2500FX
    - DC port
    - Aux
    - 2 x RJ-45 (Copper)
    - 2 x SFP (Fiber)
- 



## THE PRODUCTS



### **EtherHaul-8010FX**

#### The Ultimate Solution for the Private Market

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The ultimate solution for the private market is the EH-8010FX, a 10Gbps wireless backhaul radio optimized for high-capacity metro, aggregation, and infrastructure networks. With its long reach, fiber-like performance, ultra-low latency, and small form factor, it provides a flexible and easy-to-deploy fiber extension solution for service providers and enterprises.

Key features include 10Gbps throughput with the longest reach in its class, IP67 weatherproofing, and bridging, with AES encryption to ensure secure wire-speed connectivity. Its robust design delivers proven reliability even in harsh conditions.

Operating in the 71-76/81-86GHz E-band, the EH-8010FX avoids interference with 10GHz of available spectrum globally. Its high-gain antennas enable massive frequency reuse. As always, E-band benefits from low licensing costs and fast approval processes.

With advanced networking capabilities like QoS awareness, the EH-8010FX integrates seamlessly with existing networks. It provides exceptional value, driving fast ROI and low TCO through scalable performance, easy deployment, and reliable operation



**SCALABLE PERFORMANCE  
EASY DEPLOYMENT, AND RELIABLE OPERATION**

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## THE PRODUCTS

# EtherHaul-8010FX Products Specifications

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## RADIO

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- Supported frequency bands: 71-76GHz / 81-86GHz, FDD
  - Radio capacity: 10 Gbps
  - Supported channel spacing: 71-76GHz / 81-86GHz, FDD
  - ACM Up to 9 levels of hitless adaptive bandwidth, coding and modulation – boost gain by over 29dB
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## NETWORKING

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- IEEE 802.1d transparent bridging
  - VLAN and VLAN stacking,
  - 4K VLANs, MEF 9, 14 and 21 compliant Ethernet services,
  - Smart Pipes Transparent Ports Mode
  - Link aggregation: LAG and LACP (IEEE 802.3ad)
  - Ethernet Ring Protection Switching:
    - ITU-T G.8032 ERPS Link state propagation
    - 16KB Jumbo frames
    - Configurable QOS-aware forwarding
  - 8 level H-QoS with multi mapping options:
    - L2: 802.1p, VLAN id., L2½: MPLS EXP, L3: DSCP
  - Security: AES 128-bit encryption
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## INTERFACES

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- EH-8010FX
    - DC port
    - 1 Copper 1 Gbp RJ-45, 1GbE Ethernet and POE-PD
    - 2 COMBO RJ-45 1/2.5/5/10GbE Ethernet (right) and SFP+ 10GbE (left)
- 



## THE PRODUCTS



### IP-50EX

#### The smallest form factor, carrier grade mmW radio

IP-50EX is an ultra-compact high-capacity E-Band radio. The incredibly small footprint of the IP-50EX with its integrated antenna, low power consumption, and easy installation make it ideally suited for a variety of use cases, especially when minimal visibility and low OPEX are priorities.

IP-50EX provides up to 10 Gbps capacity in 1+0 configurations. In a 2+0 XPIC configuration, IP-50EX provides up to 20 Gbps, with seamless traffic distribution and improved link survivability. As a carrier-grade solution, it comes equipped with an integrated Carrier Ethernet services switch that includes a 25GbE traffic interface making it easier connecting to similar interfaces, the Carrier Ethernet services switch also complies with MEF CE 2.0 and SLA requirements for essential services applications.

Additionally, the IP-50EX features Adaptive Coding Modulation and Bandwidth (ACMB), providing hitless transmission and efficient modification of the radio's modulation as well as its channel bandwidth, to cope with fading conditions. IP-50EX's versatile design makes it a great candidate for a diverse range of networking requirements, including everything from macro site backhaul to small cell connectivity and building-to-building connections.

Its dependable performance and advanced features make the IP-50EX an excellent choice for networks requiring enhanced capacity and efficient, compact deployment options.



**COST EFFECTIVE, HIGH CAPACITY  
WITH CARRIER GRADE PERFORMANCE**



## THE PRODUCTS

### IP-50EX Products Specifications

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#### RADIO

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- Supported frequency bands: 71-86GHz
- Radio capacity: 10 Gbps / 20 Gbps\*
- Supported channel spacing: 250-2000MHz
- ACM steps: 11, 1/2 BPSK-1024QAM
- High TX Power
- Antenna options:
  - Parabolic
  - Integrated flat panel
  - E-Stabilizer

#### NETWORKING

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- IEEE 802.1d transparent bridging
- Supports XPIC and Multiband
- Networking: integrated Carrier Ethernet switching capabilities, MEF Carrier Ethernet 2.0 compliant | carrier-grade service resiliency (G.8032, MSTP) | SyncE and 1588 synchronization | ITU-T Y.1731 fault and performance management (MEF 35) | SDN | layer 3 (using IP-50FX)
- Security: AES radio encryption | Secured protocols and management interfaces (HTTPS, TLS, SSH, SNMPv3) | Secured architecture and software design | Advanced authentication and identification management

#### INTERFACES

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- 2 x 1/10/25GbE traffic interface (SFP28)
  - 1/10GbE traffic interface (SFP+, eCPRI)
  - 1GbE management/PoE port
- 



## THE PRODUCTS



### IP-50E

#### Fiber-like Ultra High capacity

The IP-50E universal E-Band radio delivers ultra-high capacity of up to 20Gbps, supporting a pay-as-you-grow strategy with up to two units in XPIC configuration with layer-1 carrier aggregation over a single cable. Wherever you need fiber-like capacity for backhaul or wireless access applications, the IP-50E is your cost-efficient, easy-to-deploy fiber-replacement solution.

The IP-50E also allows extended E-Band reach with no compromise on availability, thanks to its unique multiband capability.

Using layer-1 carrier aggregation, the IP-50E enables you to combine this high-capacity carrier with any additional microwave, fiber or leased line connection, thereby ensuring your high-priority service offering meets its SLA target.

Combined with Ceragon's IP-50C, IP-20C, 3rd party radio and a multiband antenna, you can achieve a compact, all-outdoor, direct-mount 3-carrier solution (single-carrier E-Band + two-carrier microwave). This saves on tower load and shelter requirements while simplifying installation, allowing faster time to market, and enhancing operational efficiency.



**MITIGATE AVAILABILITY ISSUES  
WITH MULTIBAND PEACE OF MIND**



## THE PRODUCTS

### IP-50E Products Specifications

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#### RADIO

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- Supported frequency bands: 71-86GHz
- Radio capacity: 10 Gbps / 20 Gbps\*
- Supported channel spacing: 250-2000MHz
- ACM steps: 11, 1/2 BPSK-1024QAM
- High TX Power
- Antenna options:
  - Parabolic
  - Integrated flat panel
  - E-Stabilizer

#### NETWORKING

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- IEEE 802.1d transparent bridging
- Supports XPIC and Multiband
- Networking: integrated Carrier Ethernet switching capabilities, MEF Carrier Ethernet 2.0 compliant | carrier-grade service resiliency (G.8032, MSTP) | SyncE and 1588 synchronization | ITU-T Y.1731 fault and performance management (MEF 35) | SDN | layer 3 (using IP-50FX)
- Security: AES radio encryption | Secured protocols and management interfaces (HTTPS, TLS, SSH, SNMPv3) | Secured architecture and software design | Advanced authentication and identification management

#### INTERFACES

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- 4 x 1/10GbE or 40GbE traffic interface (QSFP+)
  - 1/10GbE traffic interface (SFP+, CPRI, eCPRI)
  - 1GbE traffic interface (SFP) or 1/2.5GbE multiband port
  - 1GbE management/PoE port
- 



## FINDING THE PERFECT FIT

If you're trying to determine which device is the right fit for your network, start narrowing your options by identifying your spectrum and capacity requirements. Once that's squared away, you can filter the list further by selecting the devices that deliver your must-have features. Costs are always a consideration, greater power, and performance often correlate with an increase in CAPEX and OPEX. Finally, you'll want to finish up by giving some thought to those nice-to-have future-friendly features.

	PRODUCT	STREET LEVEL	ROOFTOP	ANTENNAS	MAX RATE	1 GB TRAFFIC PORTS	10<GB PORTS
V-BAND	EH-614TX	+	+	Integrated - 36dBi (0.5ft)	1Gbps Aggregated	3	
	EH-710TX	+	+	38dBi (.5ft), 43dBi (1ft), 46dBi (1ft), 50dBi (2ft)	1Gbps Aggregated	3	
E-BAND	EH-1200F/FX	-	+	38dBi (.5ft), 43dBi (1ft), 46dBi (1ft), 50dBi (2ft)	1Gbps FD	2	
	EH-2500F/FX	-	+	38dBi (.5ft), 43dBi (1ft), 46dBi (1ft), 50dBi (2ft)	2Gbps FD	4	
	EH-8010FX	-	+	38dBi (.5ft), 43dBi (1ft), 46dBi (1ft), 50dBi (2ft)	10Gbps FD	1	2x10GbE
	IP-50EX	-	+	44dBi (1ft) 50dBi (2ft)	10Gbps FD		2x25GbE
	IP-50E	-	+	43dBi (1ft) 50dBi (2ft) 54dBi (3ft)	20Gbps FD in 2+0		1x40 GbE 4x10 GbE 1x10 GbE



## SUMMARY

Ceragon's family of mmW radios introduces cutting-edge technological innovations, utilizing the most compact radios and providing the highest bandwidth support. These advanced solutions are meticulously designed to deliver the most optimized performance with low latency, high availability and high capacity. Embrace these flexible solutions to maintain a competitive edge in the era of digital modernization and elevate your network to new heights.

### 4 MAIN VALUES



### ABOUT CERAGON NETWORKS

Ceragon Networks Ltd. (NASDAQ: CRNT) is the global innovator and leading solutions provider of end-to-end wireless connectivity, specializing in transport, access, and AI-powered managed & professional services. Through our commitment to excellence, we empower customers to elevate operational efficiency and enrich the quality of experience for their end users.

Our customers include service providers, utilities, public safety organizations, government agencies, energy companies, and more, who rely on our wireless expertise and cutting-edge solutions for 5G & 4G broadband wireless connectivity, mission-critical services, and an array of applications that harness our ultra-high reliability and speed. Ceragon solutions are deployed by more than 600 service providers, as well as more than 1,600 private network owners, in more than 130 countries.

Through our innovative, end-to-end solutions, covering hardware, software, and managed & professional services, we enable our customers to embrace the future of wireless technology with confidence, shaping the next generation of connectivity and service delivery. Ceragon delivers extremely reliable, fast to deploy, high-capacity wireless solutions for a wide range of communication network use cases, optimized to lower TCO through minimal use of spectrum, power, real estate, and labor resources - driving simple, quick, and cost-effective network modernization and positioning Ceragon as a leading solutions provider for the "connectivity everywhere" era.

For more information please visit: [www.ceragon.com](http://www.ceragon.com)

