



# FibeAir<sup>®</sup> IP-10 Series

Product Guide

**CERAGON**



# Ceragon's FibeAir IP-10 Series

## High Capacity Packet & Hybrid Wireless Backhaul

FibeAir IP-10 is an innovative series of high-capacity wireless backhaul platforms. FibeAir IP-10 systems are designed to enable telecom and private network operators quick and cost efficient implementation of high speed wireless backhaul networks, achieving faster time to revenue. With unmatched spectral efficiency, low power consumption and support for diverse deployment scenarios, FibeAir IP-10 systems allow operators to get the most out of their existing network resources while reducing their total cost of ownership (TCO).

The FibeAir IP-10 series is a powerful product line that integrates superior networking functionality with the industry's most advanced microwave technology creating a superior microwave transport solution.

The Operations, Administration and Maintenance (OA&M) tools coupled with the full suite of management systems (NMS and EMS) simplify network provisioning and monitoring, reducing operators' TCO and enabling them to meet the most stringent SLAs.

The FibeAir IP-10 series provides a wide range of configurations to match the requirements of diverse networking scenarios. Innovative features that support TDM and Ethernet services enable FibeAir IP-10 to function incomparably as a high-performance mobile backhaul solution for all generations of mobile networks. The series meets the networking and OA&M demands of cellular and fixed-network operators as well as private networks, enterprise, utilities and other industry-specific applications. Combined with Ceragon's network management and element management tools, FibeAir IP-10 simplifies operations and provides a perfect, service-aware platform for end-to-end, high-capacity backhaul networks.

## All-Packet & Hybrid Backhaul

- High Capacity and Spectral Efficient Product Series
- Fits All Backhaul Architectures and Transport Technologies
- High Availability and Robust Resilient Design for All Topologies
- Seamless Swap/Replacement Path for Existing Installed Base



# FibeAir IP-10 Product Series

## FibeAir IP-10G

FibeAir IP-10G is a high-capacity wireless backhaul product designed to deliver both Ethernet and TDM services. The device can be located in tail or nodal sites delivering the services over a single or multiple carriers. FibeAir IP-10G facilitates seamless migration from legacy TDM to all-packet Ethernet networks as it delivers TDM services in their native form or over all-packet transport using Ceragon's Smart TDM Pseudowire solution.



## FibeAir IP-10E

FibeAir IP-10E is a high-capacity wireless backhaul product designed to deliver Ethernet services in all-packet networks. The device can be located in tail or nodal sites delivering the services over a single or multiple carriers.



## FibeAir IP-10Q

FibeAir IP-10Q is a high-density wireless backhaul solution optimized for the delivery of Ethernet services in Ethernet and IP/MPLS aggregation networks. The device features a modular design that supports four carriers in a single rack unit. It offers seamless multi-carrier scalability up to 4Gbps.



## FibeAir IP-10C

FibeAir IP-10C is a compact, all-outdoor, high-capacity packet radio designed to deliver Ethernet services in Smart-pipe mode. Utilizing the advantages of an all-outdoor radio, it can be installed quickly and cost-effectively to deliver up to 1 Gbps per carrier.









## FibeAir IP-10 Attributes

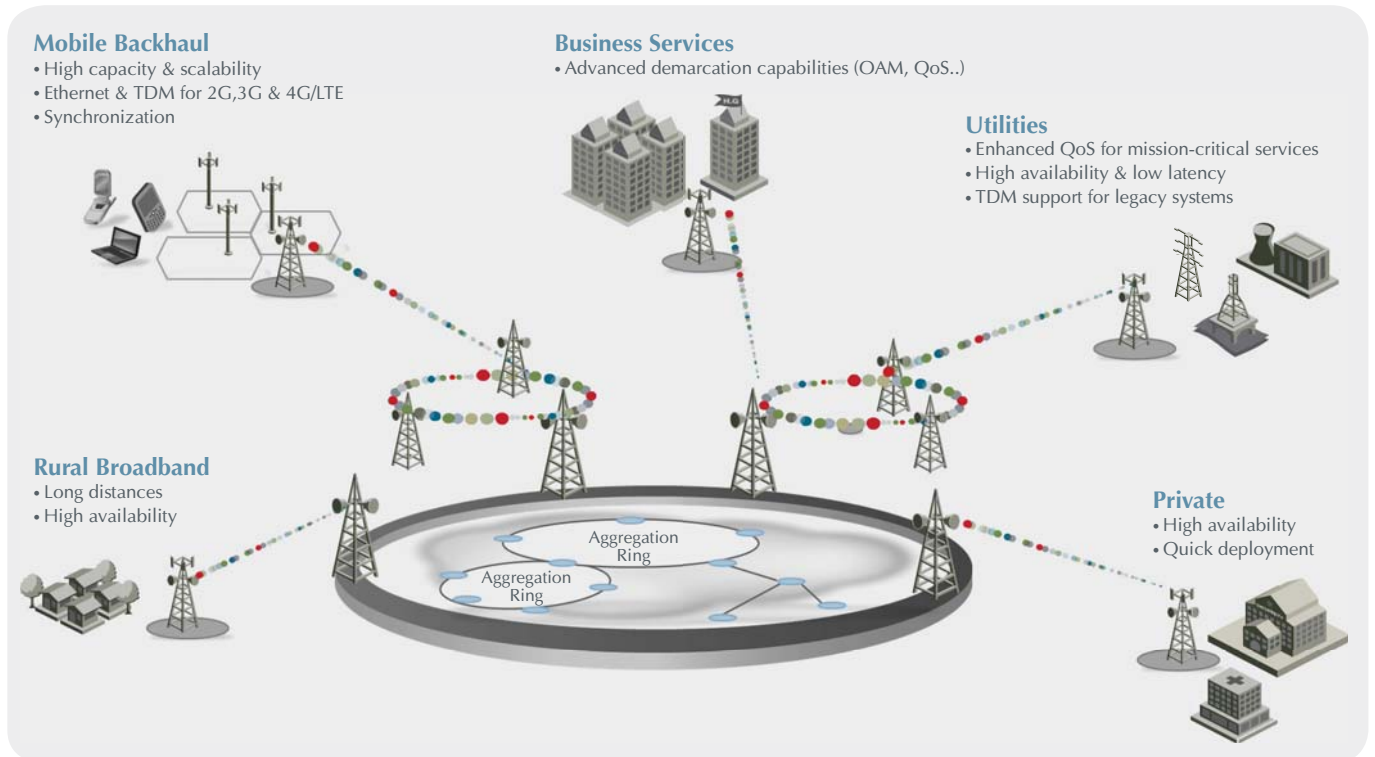
	FibeAir IP-10G	FibeAir IP-10E	FibeAir IP-10Q	FibeAir IP-10C
<b>Role in the network</b>	Tail site (access) Aggregation sites (nodal)	Tail site (access) Aggregation sites (nodal)	Aggregation sites (Smart Pipe)	Tail site (access)
<b>Transport Technology</b>	Hybrid (Packet and TDM), All-packet	All-packet	All-packet	All-packet
<b>Site Configuration</b>	Split-mount	Split-mount	Split-mount	All-outdoor
<b>Supported Integration levels</b>	Smart Pipe Carrier Ethernet Switch TDM XC/TDM PW	Smart Pipe Carrier Ethernet Switch	Smart Pipe	Smart Pipe
<b>Ethernet Ports</b>	5 x 10/100Base-T RJ45 + 2 x (10/100/1000Base T RJ45 or 1000FX SFP)	5 x 10/100Base-T RJ45 + 2 x (10/100/1000Base T RJ45 or 1000FX SFP)	4 x (10/100/1000Base-T RJ45 or 1000FX SFP+2 x 10/100/1000Base-T RJ45)	10/100/1000Base-T RJ45 or 1000FX SFP + 2 x 10/100/1000Base-T RJ45
<b>TDM Ports</b>	16 x E1/DS1 Optional additional 16 x E1/DS1 or 1 x ch STM1/ OC3 optional TDM Pseudowire processing (CESoPSN, SATOP)	N/A	N/A	N/A
<b>Configurations</b>	1 + 0 (standalone) 1 + 1, 2 + 0, 2 + 2 (stacking) Space Diversity - BBS, IFC (with RFU 1500HP only), Frequency Diversity (BBS)	1 + 0 (standalone) 1 + 1, 2 + 0, 2 + 2 (stacking) Space Diversity - BBS, IFC (with RFU 1500HP only), Frequency Diversity (BBS)	4 x (1 + 0), 2 x (2 + 0) 1 + 0, 2 + 0, 2 + 2, 4 + 0, 3 + 1 Space Diversity - BBS, IFC (with RFU 1500HP only), Frequency Diversity (BBS)	1 + 0, 1 + 1, 2 + 0 SP

# FibeAir IP-10 Positioning

The FibeAir IP-10 product series includes both Ethernet- and TDM-supporting products that can be located in tail or nodal sites aggregating traffic from numerous other sites.

	Ethernet + TDM	Ethernet	
Single Carrier Single Direction	<b>IP-10G</b>  Tail Site	<b>IP-10E</b>  Tail Site	<b>IP-10C</b>  Compact All-Outdoor
Multi Carrier Multi Direction	<b>IP-10G</b>  Nodal	<b>IP-10E</b>  Nodal	<b>IP-10Q</b>  Aggregation
	Integrated Backhaul (L2)		Smart Pipe (L1)

# FibeAir IP-10 Applications





# FibeAir IP-10 Series Highlights

## Spectral Efficiency & System Performance

- 6GHz - 42GHz licensed bands
- ETSI & FCC channels – 3.5MHz – 56MHz
- Adaptive Power ACM, QPSK to 256QAM
- Multi-Carrier ABC (Adaptive Bandwidth Control) for aggregation links supporting 1+0, 2+0 and 4+0
- From 1Gbps to 4Gbps capacity per device
- Advanced multi-layer compression techniques (Header and Payload) for additional capacity
- Asymmetrical links support for optimal spectrum utilization and enhanced capacity
- Low latency (<0.21msec over 28MHz channels) for mission critical applications
- Industry-leading system gain for higher link availability, smaller antennas and longer link span
- Compatible with RFU-C & RFU-HP

## Solid Economic Value

- Pay-as-you-grow model to reduce network costs
- Future capacity growth and additional functionality enabled with license keys
- Innovative, stackable nodal solution using the same hardware for tail & nodal sites (IP-10G & IP-10E)
- Green technology for reduced OPEX: Power saving mode reduces > 30% power consumption

## High Integration & Supported Services

- Integrated Ethernet switch (IP-10G & IP-10E) and optional TDM cross-connect (IP-10G)
- Optional Smart TDM Pseudowire (IP-10G)
- End-to-end provisioning and group configuration mode for Carrier Ethernet services
- Smart-pipe modes for overlay IP, IP/MPLS, MPLS-TP or PBB deployments
- MEF E-Line & E-LAN services
- MEF 9 & MEF 14 Certified
- NEBS GR-1089-CORE and GR-63-CORE certified (IP-10G)
- Integrated synchronization solutions (SyncE, 1588, Native)
- Fully integrated, high-end radio system
- Advanced QoS traffic manager for SLA

## Redundancy & Resiliency

- No-single-point-of-failure design
- Indoor units (IDU) & radio units redundancy based on 1+1 & 2+2 HSB
- Network-level resiliency based on RSTP/Ring RSTP and SNCP/ABR
- Adaptive Bandwidth Recovery (ABR)
- Line redundancy via LAG
- N+0 radio protection based on multi-carrier Adaptive Bandwidth Control (ABC)



## Ceragon's NMS

Ceragon's innovative, user-friendly Network Management System (NMS) is designed for managing large-scale wireless backhaul networks. The NMS provides enhanced system functionality and comprehensive network management for current and legacy radios, including FibeAir IP-10 and Evolution Series.

Built on a powerful platform, the NMS offers a comprehensive set of management functions to provide maximized network uptime and reduce operational costs.

Ceragon's NMS is fully scalable and can support up to dozens of clients per server which translates to thousands of network elements per server.





# FibeAir IP-10 Radio Units

All FibeAir indoor units are compatible with all RFUs

## RFU-C

A software configurable, state-of-the-art RFU designed for a broad range of interfaces and capacities from 10 Mbps up to 500 Mbps. This innovative and compact unit uses an “on-the-fly” upgrade method whereby network operators buy capacity only as needed, saving on initial investments and ongoing OPEX.



RFU-C	Split Mount Radio Frequency Unit
<b>Possible Installations</b>	Direct Mount 1 + 0, Direct Mount 1 + 1, Direct Mount 2 + 0 Remote Mount 1 + 0, Remote mount 1 + 1, Remote mount 2 + 0, Remote mount 2 + 2
<b>Supported Channel Bandwidths</b>	3.5, 7,10, 14, 20, 25, 28, 29.65, 29, 30, 40 ,50, 56 MHz
<b>Other Installations</b>	2 + 0 XPIC, 2 + 2 XPIC
<b>Space Diversity Modes</b>	BBS (Baseband Switching)
<b>Supported Polarizations</b>	Vertical & Horizontal
<b>Supported Frequencies</b>	6 GHz – 42 GHz
<b>TX Power</b>	Up to 24 dBm
<b>Supported Antennas</b>	Andrew HP series, RFS SU series, Xian Putian WTC series, antenna adapters for 3rd party antennas are also available

## RFU-HP

A high transmit power RFU designed for longer distances than the RFU-C and with multiple carrier traffic. With its unique branching design, RFU-HP can chain up to five carriers per single antenna port and ten carriers for dual port, making it ideal for Trunk or Multi-Carrier applications. The RFU-HP can be installed in either indoor or outdoor configurations.



RFU-HP	Split Mount & All-indoor Radio Frequency Unit
<b>Possible Configurations</b>	1 + 0, 1 + 1, Up to 4 + 0, All-indoor horizontal 1 + 0, All-indoor horizontal 1 + 1
<b>Supported Channel Bandwidths</b>	10/14/20/28/29.65/30/40/50/56 MHz
<b>Other Installations</b>	2 + 0 XPIC, 2 + 2 XPIC
<b>Space Diversity Modes</b>	BBS (Baseband Switching), IFC (IF combining)
<b>Supported Polarizations</b>	Vertical & Horizontal
<b>Supported Frequencies</b>	6 GHz – 11 GHz (11GHz supported in 1500HP only)
<b>TX Power</b>	Up to 33 dBm
<b>Green Mode</b>	Power consumption saving mode
<b>Supported Antennas</b>	Andrew HP series, RFS SU series, Xian Putian WTC series

Ceragon Comprehensive Network Offering:



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