HARMONY ENHANCED^{MC}

HIGH POWER MULTI CARRIER PACKET MICROWAVE

DragonWave

DELIVERING THE LOWEST COST PER BIT OVER MICROWAVE

This high capacity packet microwave radio builds upon the Harmony Enhanced family by delivering a multi-carrier system, doubling the capacity available in a single ODU. Because the radio and modem are integrated into a single, highly-compact outdoor unit, Harmony Enhanced^{MC} is a zero-footprint solution – eliminating rack congestion and minimizing collocation space. The Ultra High Transmit Power increases the overall system gain and allows for deployment of smaller dishes, higher order modulations, or increased link availability.

Using DragonWave-X's unique Bandwidth Accelerator+ technology, along with wide channel support and 4096 QAM modulation, the Harmony Enhanced^{MC} provides exceptional spectral efficiency with up to 4 Gbps in a single radio and up to 8 Gbps on a single antenna using two ODUs with L1 aggregation.

With unmatched capacity and system gain, simple installation and operation, as well as sophisticated remote management capability, the Harmony Enhanced^{MC} delivers significant lifecycle cost savings for service providers and enterprises alike.
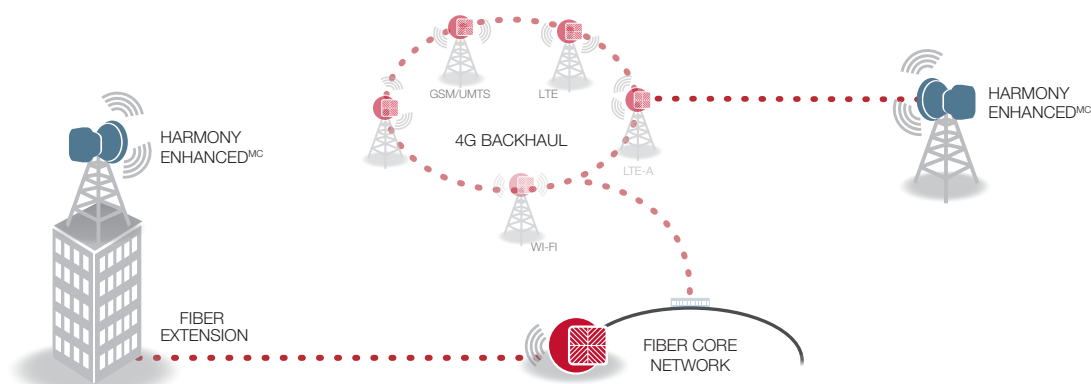
This innovative, carrier-grade packet microwave solution operates in licensed or unlicensed spectrum from 6 to 42 GHz.

SOLUTION HIGHLIGHTS

- Zero footprint, fully integrated all-outdoor unit
- Ultra high power radio option with up to 35dBm of transmit power
- 4 x 4 MIMO ready hardware supporting up to 8 Gbps capacity with DragonWave-X's Bandwidth Accelerator+
- Single Radio XPIC configuration
- Wide channel support up to 112 MHz
- Up to 4096QAM modulation support
- Service aware Hitless Automatic Adaptive Modulation (HAAM)
- Support for SyncE and 1588v2 Transparent Clock
- Pay-as-you-grow with automatic remote scalability
- Multi-port capability including an integrated 10Gb Ethernet port
- Comprehensive Ethernet OAM support (802.3ah, 802.1ag, Y.1731) and MEF services
- Advanced QoS support with 8 levels of prioritization
- Comprehensive management and provisioning with NetViewer NMS
- Intuitive EMS with Linkview
- Lowest total cost of ownership solution
- SDN Ready

KEY APPLICATIONS

- Mobile Backhaul
- Leased Line Replacement
- Last Mile Fiber Extension
- Private and Enterprise Networks

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FIBER EXTENSION

GSM/UMTS LTE

4G BACKHAUL

LTE-A

WI-FI

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FIBER CORE NETWORK

NetViewer Network Management

FREQUENCIES

6 GHz	FCC/IC/ETSI/ITU
7/8 GHz	ETSI/ITU/IC/NTIA
10.5 GHz	ETSI/ITU
11 GHz	FCC/IC/ETSI/AUS/NZ/ITU
13 GHz	FCC/ETSI/AUS/NZ/ITU
15 GHz	IC/ETSI/AUS/NZ/MX/ITU
18 GHz	FCC/IC /ETSI/AUS/NZ/ITU
23 GHz	FCC/IC/ETSI/AUS/NZ/ITU/MX
24 GHz	DEMS - FCC/IC
26 GHz	ETSI
28 GHz	FCC/ETSI
31/32 GHz	ETSI
39 GHz	FCC/ETSI/AUS/NZ/MX
42 GHz	ETSI

FEATURES

Base Capacity	Variable from 10 Mbps to 2 Gbps full duplex CIR 2x capacity up to 4 Gbps with single antenna*
Capacity w/Accelerator	Bandwidth Accelerator+ delivering up to 2x increase in base throughput
Latency GigE	<120µs @ 2048QAM, 50 MHz
Modulations	QPSK to 4096QAM
Channel Bandwidth	25/28/30/40/50/56/80/100/112 MHz
Loopback	Yes, Radio loopback and Ethernet
Synchronization	Synchronous Ethernet (with ESMC) & 1588TC/BC

MECHANICAL

Interface	2 x 10/100/1000bT + 2 x Optical SFP (1xGE + combo 1GE/10GE)
Direct DC Port	-48 V Nominal (-27 VDC to -57.5 VDC), isolated
Radio/Modem (without antenna)	26 cm x 26 cm x 16 cm; 7.5 kg 10.5" x 10" x 6.2"; 16.5 lbs
Antenna Wind Loading	112 kph (70 mph) operational, 200 kph (125 mph) survival
Antenna Mount Adjustment	+/- 45° Azimuth; +/- 22° Elevation

ELEMENT MANAGEMENT

Alarm Management	SNMP Traps, Enterprise MIBs
NMS Support	DragonWave-X's NetViewer or any SNMP based network manager
EMS Support	Linkview
SNMP Support	V1, V2c
Management Access	Web based management, EMS,Telnet
Ethernet OAM Fault Management	802.1ag, 802.3ah, Y.1731
Ethernet OAM Performance Management	Y.1731
Authentication, Authorization & Accounting	RADIUS, TACACs+
Management Interface	In band and out of band
Addressing	IPv4 / IPv6

ENVIRONMENTAL

Operating Temperature	-40°C to + 55°C (-40°F to +131° F)**
Humidity	100 % Condensing
Altitude	5000 m (16,404 ft)
Water Tightness	IP66 (directed hose test)
Operational Shock	ETSI 300-019-1-4; 5g 11ms
Operational Vibration	ETSI 300-019-1-4 Class 4m5
Earthquake	NEBS GR-63

ETHERNET

Packet Size	Up to 9600B
Flow Control	Color Aware congestion avoidance (WRED)
Prioritization	8 levels served by 8 hardware queues, based on 802.1p/q, MPLS, DSCP
Ethernet Services	ELINE/ELAN

* Assumes 112MHz bandwidth

** Assumes minimum moving air speed of 10 km/h

DragonWave

www.dragonwavex.com