



HARMONY ENHANCED^{MC}

HIGH POWER MULTI CARRIER PACKET MICROWAVE

DELIVERING THE LOWEST COST PER BIT OVER MICROWAVE

This high capacity packet microwave builds upon the Harmony Enhanced family by delivering a multi-carrier channel system thereby 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 Power increases the overall system gain and allows for deployment of smaller dishes, higher order modulations, or increased link availability.

Equipped with DragonWave's Bandwidth Accelerator+ technology, the Harmony Enhanced^{MC} achieves the highest degree of spectral efficiency (through 4096 QAM, 4 x 4 MIMO and wider channels), delivering more capacity per channel with a longer reach than any other all-outdoor microwave system. Harmony Enhanced^{MC} delivers industry leading capacities up to 4Gbps in a single radio and 8Gbps in a single channel with MIMO or a single antenna with XPIC.

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.

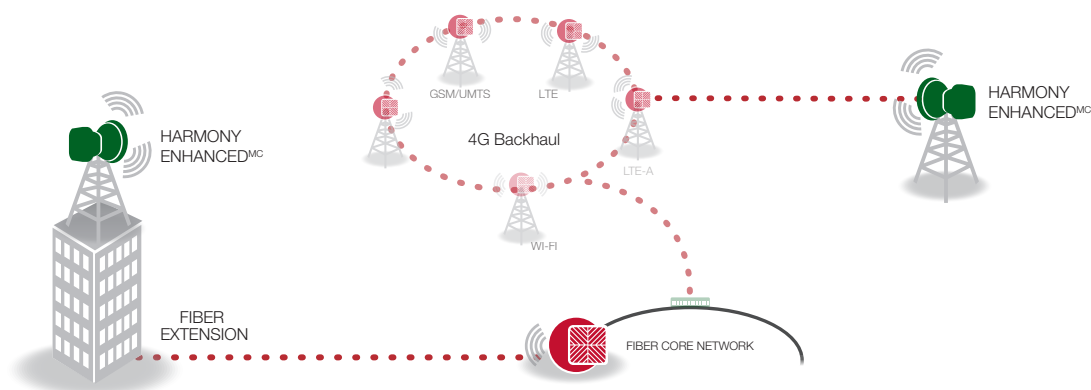
This innovative, carrier-grade packet microwave solution operates in licensed or unlicensed spectrum from 6 to 42 GHz.

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'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)
- SyncE support 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



NetViewer Network Management

FREQUENCIES

| | |
|-----------|---------------------------|
| 6 GHz | FCC/IC/ETSI/ITU |
| 7/8 GHz | ETSI/ITU/IC/NTIA |
| 10.5 GHz | FCC/IC/ETSI/ITU |
| 11 GHz | ETSI/AUS/NZ/ITU |
| 13 GHz | 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 | FCC/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 | 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 |

*Assumes 112MHz bandwidth

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

ELEMENT MANAGEMENT

| | |
|-----------------------------------------------|-------------------------------------------------------------|
| Alarm Management | SNMP Traps, Enterprise MIBs |
| NMS Support | DragonWave'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 |