



DragonWave HE+

FULL OUTDOOR MICROWAVE RADIO

FULL OUTDOOR ZERO FOOTPRINT PACKET MICROWAVE

DragonWave Technologies is offering its HE+ high-performance single-carrier packet microwave radio for deployment in the licensed 2-42 GHz bands and in several unlicensed bands in the 2.4 – 24 GHz frequency range. Using advanced modulation of up to 1024 QAM, and radio channels of up to 112 MHz, 890 Mbps of full duplex capacity per single 1+0 link is at your fingertips.

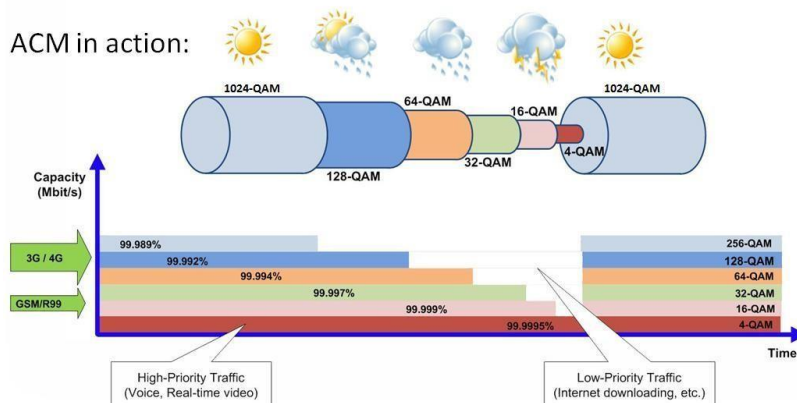
Microwave radio is a well-established technology used by telecommunication operators and private networks alike. Service availability is ensured through careful frequency planning and link engineering. Our HE+ microwave radios are distinguished by being fully licensed out of the box, by delivering good performance, by their advanced features and by delivering excellent value-for-money.

PERFORMANCE, FLEXIBILITY & FEATURES

DragonWave Technologies has pioneered the use of Software Defined Radio, which enables in-service upgrades, remote configuration and low total cost of ownership. Radio features such as Adaptive Coding and Modulation (ACM) ensure maximum uptime for customers that offer SLAs based on uptime or are limited on antenna size. Networking features such as QoS and QinQ VLAN are there as well. Carrier-centric features such as Rapid Spanning Tree (RSTP) ensure that redundant paths can be utilized, enhancing network resiliency. HE+ also supports Synchronous Ethernet (SyncE) which is useful in radio access networks.



Attainable link operating distances can vary widely depending on the link frequency, antenna and channel sizes, the prevailing rain zone, and the desired link throughput & link availability. DragonWave Technologies has a complete range of tools and services available to plan your microwave network to meet all design objectives. Generally, higher frequencies are used for short-range, high-capacity links, and lower frequencies are used for long range links. Link lengths exceeding 100 km are possible if properly designed and deployed.



WIDE RANGE OF FREQUENCIES AND BANDS AVAILABLE

FREQUENCY BAND SUPPORT

HE+ Frequency Division Duplex (FDD) radios are available in all commonly used licensed frequency bands around the world and also in several unlicensed bands. Please note that those unlicensed bands are not necessarily unlicensed in all countries: always check with your local regulator prior to purchase or deployment.

Licensed Frequency Bands (GHz)																		
Band	3.5	3.6	4	6L	6U	7	8	10.5	11	13	15	18	23	26	28	32	38*	42*
Frequency	3.4-	3.6-	4.4-	5.9-	6.4-	7.1-	7.9-	10.1-	10.7-	12.7-	14.4-	17.7-	21.2-	24.5-	27.5-	31.8-	37.0-	40.5-
Range	3.6	4.2	5.0	6.4	7.1	7.9	8.5	10.7	11.7	13.3	15.4	19.7	23.6	26.5	29.5	33.4	40.0	43.5

* **Volume Availability:** Please check with factory.

Unlicensed Frequency Bands (GHz)					
Band	2.4	5	10.5	17	24
Frequency	2.30-	5.5-	10.3-	17.1-	24.0-
Range	2.45	5.9	11.6	17.3	24.25

SYSTEM FEATURES

- Compact, all-outdoor & zero-footprint packet microwave radio system
- Rugged and proven telecom-grade design
- Capacity of up to 890 Mbps full duplex
- Spectrally efficient with up to 1024 QAM modulation
- Channel size of up to 112 MHz
- Adaptive Coding and Modulation (ACM) & Adaptive Power Control (APC)
- Powerful Forward Error Correction (FEC)
- Rapid spanning tree (RSTP), QoS, QinQ and Jumbo frame (9600 byte) support
- Network synchronization using Sync-E
- Available as PoE-powered single-port GbE PoE copper variant or as an optical variant with SFP cage & DC-power

APPLICATIONS

- Backhaul for cellular network operators
- Corporate backbone links
- Resilience & back-up for fibre links
- CCTV backhaul for multiple cameras
- Temporary point-to-point networking deployments with rapid deployment



PRODUCT SPECIFICATIONS

System Parameters	
Licensed frequency bands	3.5, 3.6, 4, 6L, 6U, 7, 8, 10.5, 11, 13, 15, 18, 23, 26, 28, 32, 38 & 42 GHz Factory-set to a specific sub-band & duplex spacing
Unlicensed frequency bands	2.4, 5.5 - 5.8, 10.5, 17 & 24 GHz
Channel sizes	CEPT/ETSI: 7, 14, 28, 56 & 112 MHz – 112 MHz is supported where possible & allowed. ANSI/FCC: 10, 20, 30, 40, 50, 60 & 80 MHz
Capacity	Up to 890 Mbps full duplex net throughput in 112 MHz channels
Modulation types	QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM
Rx Sensitivity	-55.0 through -89.1 dBm \pm 2 dB depending on channel size & modulation used
Tx output Power	14 - 25 dBm \pm 2 dB – depending on frequency variant and modulation
Forward Error Correction	Trellis-Coded Modulation concatenated with Reed-Solomon Coding
Radio configurations	1+0 standalone and 1+1 & 2+0 with external switch
Network management	SNMPv2, SNMPv3
Advanced features	ACM, ATPC, QoS, QinQ, RSTP, Jumbo Frames (9600 B)
Network synchronization	Synchronous Ethernet (ITU-T G.8261/G.8262/G.8264 ESMC)
Data interface	
IP/Ethernet interface	Standard variant: 1000Base-T (Standard IEEE 802.3) powered through a proprietary High-Power-over-Ethernet power injector. Optional variant: SFP cage for optical SFP modules (SM, MM, CWDM) powered through a -48 V DC-carrying coaxial cable.
Antennas	
Antenna types	Parabolic antenna with radome – 30 cm up to 3 m in diameter.
Antenna gain/ beamwidth	Depends on antenna diameter & frequency: refer to appropriate antenna data sheet
Power / Environment	
Power supply voltage	-40 to -60 Volts DC, -48V DC nominally
Power consumption	<35 W depending on specific model
Operational temperature	-20°C to 55°C ETS 300 019-2-4 Class 4M5
Operational humidity	0 to 95%, non-condensing
Physical Dimensions	
Dimensions & weight radio	280 x 240 x 110 mm, 3.05 kg
Dimensions & weight indoor power injector	170 x 150 x 39 mm, 0.50 kg