



BridgeWave
COMMUNICATIONS

FLEXPORT® μ WAVE

Ultra High Capacity Microwave Links for High Bandwidth Applications

The FlexPort μ Wave family of microwave radio systems has been designed specifically to meet the requirements of operators, carriers, and service providers requiring full-rate gigabit connectivity in a single, compact, all-outdoor enclosure.

F μ Wave accomplishes this through an innovative approach in aggregating multiple RF channels without the need for additional hardware as with other lower licensed frequency band products. This helps ease installation and maintenance costs on the network by offering only one device to install and manage, providing a highly-reliable, fully integrated backhaul solution. With flexibility of interfaces, F μ Wave contains an integrated 5-port GigE switch with field pluggable SFPs for single-mode fiber, multi-mode fiber or copper connections to the radio. Adaptive Rate Modulation allows the radio to compensate for rain fades while maintaining link integrity and keeping SLAs during periods of inclement weather. Optional 256-AES encryption provides the highest level of link security while adding only 2 uSec of latency. F μ Wave can be powered via direct -48VDC feed, or via an optional PoE injector and extractor kit.

F μ Wave is available in two configurations yielding ultra high capacity connectivity: The -1000 model uses 256QAM and one 150 MHz (18 & 23 GHz) or 160 MHz (24 GHz) channel to yield 1000 Mbps full-duplex transmissions. For environments where a single 150/160 MHz channel cannot be utilized, the -700 model uses 64QAM and three 50 MHz (18 & 23 GHz) channels to provide 700 Mbps full-duplex transmission.

BridgeWave is the market leader in providing highly reliable high capacity wireless solutions for next generation 4G networks. The FlexPort family of products leverages our expertise in designing and bringing to market carrier-class millimeter wave and microwave solutions that have been accepted and used in thousands of installations worldwide.



**FlexPort μ Wave
With 12" (30cm) Antenna**

WIRELESS VIRTUAL FIBER SOLUTIONS FOR:



MOBILE BACKHAUL

Future-proof multi-gigabit backhaul for next generation 4G/LTE networks.



SERVICE PROVIDER

High capacity business services, fiber extensions, redundant fiber overlays.



EDUCATION

High-performance seamless campus connectivity, Wi-Fi and security camera backbone.



ENTERPRISE

Leased line replacement, LAN extensions, server centralization, remote data storage and backup.



GOVERNMENT/MUNICIPALITIES

Inter-building connections, Video surveillance systems, traffic control and monitoring, Wi-Fi/4.9 GHz backhaul.



HEALTHCARE

Secure, HIPAA-compliant medical office, lab network access, real-time imaging & records, application connectivity.

FEATURES

PERFORMANCE:

- Full-duplex gigabit Ethernet or 700 Mbps transmission depending on configuration
- Internal 5-port gigabit Ethernet switch supports jumbo frames up to 10,000 bytes
- Low latency for fiber-equivalent performance
- Innovative RF channel aggregation yields true GigE throughput (-1000 model)
- QPSK – 256QAM modem design allows flexibility in link planning
- Adaptive Rate Modulation mitigates rain fade conditions
- Low power consumption
- Direct DC feed or PoE with external injector
- HTTPS and RADIUS access security
- Optional FIPS-Certified 256-bit AES Encryption



EASE-OF-USE:

- All-outdoor design
- Field-pluggable SFPs available with multi-mode, single mode, or copper interfaces
- Web based & SNMP management

PROVEN RELIABILITY:

- Based on proven design – thousands of full-rate GigE millimeter wave terminals installed
- Rigorous HALT/HASS testing
- Up to 99.999% carrier-grade availability

SIMPLE GIGE IMPLEMENTATION:

- Less hardware to install than other microwave systems
- Lower dollar per megabit total cost of ownership
- Smaller & lighter than solutions requiring two ODUs and combiners

Backhaul Evolved®



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FLEXPOR[®] μ WAVE SPECIFICATIONS

	FlexPort18	FlexPort23	FlexPort24	
FREQUENCY RANGE T/R Spacing Frequency Plan	17.7 – 19.7 GHz 1,560 MHz ITU-R F.595-6, Annex 2, FCC Part 101.147	21.2 – 23.6 GHz 1,200 MHz ITU-R F.637-3, Annex 4, FCC Part 101.147	24.25 – 25.25 GHz 800 MHz FCC Part 101.147	
TRANSMITTER POWER OUTPUT QPSK 16QAM 64QAM 256QAM	+26 dBm +24 dBm +20.5 dBm +17 dBm	+25 dBm +24 dBm +20.5 dBm +17 dBm	+25 dBm +24 dBm +20.5 dBm +17 dBm	
FlexPort μWave -1000 (ETSI)	DATA RATES & MODULATION QPSK 16QAM 64QAM 256QAM	<i>1 x 150 MHz RF Channel</i> 234 Mbps 474 Mbps 714 Mbps 1000 Mbps	<i>1 x 160 MHz RF Channel</i> 234 Mbps 474 Mbps 722 Mbps 1000 Mbps	
	RECEIVER SENSITIVITY FOR 10⁻⁶ B.E.R. QPSK 16QAM 64QAM 256QAM	<i>1 x 150 MHz RF Channel</i> -74 dBm -68 dBm -62 dBm -56 dBm	<i>1 x 150 MHz RF Channel</i> -74 dBm -68 dBm -62 dBm -56 dBm	<i>1 x 160 MHz RF Channel</i> -74 dBm -68 dBm -62 dBm -56 dBm
FlexPort μWave -700 (ANSI)	DATA RATES & MODULATION QPSK 16QAM 64QAM	<i>1x50 MHz 2x50 MHz 3x50 MHz</i> 80 Mbps 157 Mbps 234 Mbps 157 Mbps 377 Mbps 474 Mbps 234 Mbps 482 Mbps 714 Mbps	<i>1x50 MHz 2x50 MHz 3x50 MHz</i> 80 Mbps 157 Mbps 234 Mbps 157 Mbps 377 Mbps 474 Mbps 234 Mbps 482 Mbps 714 Mbps	FlexPort μ Wave-1000 in 24 GHz is available for ANSI and ETSI. See specs above.
	RECEIVER SENSITIVITY FOR 10⁻⁶ B.E.R. QPSK 16QAM 64QAM	<i>1x50 MHz 2x50 MHz 3x50 MHz</i> -79 dBm -76 dBm -74 dBm -73 dBm -70 dBm -68 dBm -67 dBm -64 dBm -62 dBm	<i>1x50 MHz 2x50 MHz 3x50 MHz</i> -79 dBm -76 dBm -74 dBm -73 dBm -70 dBm -68 dBm -67 dBm -64 dBm -62 dBm	
FORWARD ERROR CORRECTION	Reed Solomon			
MITIGATION TECHNIQUES	Optional Adaptive Rate and Modulation (ARM) adjusts modulation to overcome link impairments. User settable switch points.			
ETHERNET INTERFACE	Fast Ethernet & Gigabit Ethernet per IEEE 802.3. One RJ-45 (CAT5e) 10/100/1000 Base-T supports line rate speeds up to gigabit Ethernet Up to 4 field pluggable SFPs supporting multimode (-SX), single mode (-LX) or copper (-T) interfaces.			
LATENCY	Dependent on configuration, as low as 110 μ Sec			
NETWORKING	Maximum Ethernet frame length: supports Jumbo packets up to 10,000 bytes Per-port Rate Limiting			
MANAGEMENT	Web-based (HTTP) embedded management agent, HTTPS secure management available SNMP Support: MIB-II And BridgeWave enterprise MIB SysLog (RFC 3164, RFC 3195) event support, RADUIS client support			
SECURITY	Option: FIPS certified 256-bit AES Encryption (export controlled)			
POWER	-48 VDC input, -37.5v to -60v range, 70 watts power consumption. Supports redundant "A" and "B" power feeds Proprietary PoE option for up to 100m CAT5e cable separation between PoE injector & extractor			
SIZE & WEIGHT	11.9" dia x 7.25" deep (30.2 cm x 18.4 cm); 14 lbs (6.3 kg)			
ENVIRONMENTAL	Operating Temperature: -33°C to +55°C (-27°F to +131°F) per EN 300 019 Class 4.1 Operating Altitude: 4,500m (14,764 ft); Water Ingress: IP66			
REGULATORY	RF Certifications, U.S. FCC Part 101; FCC ID for FP24: RWM-FP24 (FCC Part 101, DEMS) Safety: UL Listed, meets FCC 1.3.10 General Population RF MPE limits EMC/EMI: FCC Part15 Class B			

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