



**BridgeWave**  
COMMUNICATIONS

# FLEX4G™-UHA

Ultra High Availability Wireless Backhaul Solutions for 4G/LTE Networks

As mobile data consumption increases exponentially, operators are looking for backhaul solutions that provide the lowest Total Cost of Ownership (TCO) with the flexibility to easily scale to meet tomorrow's bandwidth demands.

BridgeWave's innovative Flex4G-UHA has been designed to alleviate the strain on backhaul connections by combining advanced radio and modem capabilities with carrier-grade Ethernet features. Implementing BPSK modulation achieves improved link budget compared to high-QAM systems. Furthermore, incorporating BridgeWave's patented AdaptRate™ technology achieves an additional 10dB link budget gain during periods of inclement weather.

BridgeWave's Silicon Germanium (SiGe) integration reduces complexity and increases reliability. Carrier Ethernet services are provided through the use of an integrated low-latency switch supporting jumbo frames while including Quality of Service (QoS), VLAN support, Provider Bridge (Q-in-Q) along with Ethernet OAM management. Flex4G-UHA provides comprehensive timing support required for 4G/LTE deployments, including Synchronous Ethernet and IEEE 1588.v2 with hardware-based time stamping for one-step or two-step clocks. With low power consumption and PoE capability, Flex4G-UHA provides all of the above in an environmentally friendly, compact and lightweight, zero-footprint all-outdoor solution.

BridgeWave is the market leader in providing highly reliable gigabit wireless solutions. Flex4G-UHA leverages our expertise in designing and bringing to market carrier-class millimeter wave solutions that have been accepted and used in thousands of installations worldwide.



**FLEX4G-UHA**

Shown with 30 cm 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, cellular/Wi-Fi/WiMAX backhaul, redundant fiber overlays, mesh.



### 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.

## PERFORMANCE:

- Outstanding RF performance benefiting from highly integrated SiGe architecture
- Longest link distances
- 1 Gbps full-duplex user data rate
- AdaptRate™
- Automatic Transmit Power Control
- Zero-footprint ODU with low power consumption supports Power-over-Ethernet

## CARRIER-GRADE:

- Carrier Ethernet services enabled via built-in low-latency switch
- Quality of Service (802.1p) traffic prioritization; VLAN (802.1q); Provider Bridge (Q-in-Q 802.1ad)
- Synchronous Ethernet per G.8261, G.8262 and G.8264
- PTP per IEEE 1588.v2 – Transparent clock support
- Ethernet OAM support per 802.3ah, 802.1ag and Y.1731
- 1+0 Non-protected, 1+1 HSB fully redundant, or 2+0 link configurations

## SECURITY:

- Highly secure narrow beamwidth antennas
- FIPS-certified 256-bit AES Encryption provides the ultimate in data protection at full line rate gigabit speeds with minimal latency



## PROVEN RELIABILITY:

- Based upon proven design – thousands of systems deployed worldwide
- Integrated SiGe decreases component count for exceptional reliability and MTBF
- Rigorous HALT/HASS testing
- Carrier-grade 99.999% availability

**Backhaul Evolved®**



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# FLEX4G™-UHA SPECIFICATIONS

FREQUENCY	Range: 71 – 76 GHz / 81 – 86 GHz T/R Spacing: 10 GHz, full-duplex operation RF Interface: 74.125 / 84.125 GHz, (71.875 / 81.875 GHz for FL4G-UHA-G model), BPSK modulated signal Stability: ±10 ppm																		
CONFIGURATIONS	1+0 Non-Protected; 2+0 utilizing Orthogonal Mode Transducer (OMT) 1+1 Hot Standby - dual antenna or single antenna with unequal loss coupler																		
DATA RATE	Up to 1 Gbps full-duplex user data rate, 250 Mbps initial data rate with software capacity upgrades to 500 Mbps or 1000 Mbps full-duplex Ethernet: Two pluggable SFP slots plus one RJ45 1000Base-T supports line rate speeds up to Gigabit Ethernet																		
F.E.C	Reed-Solomon																		
SYSTEM PERFORMANCE	<table><tr><td></td><td>Operating Mode</td><td>Normal</td><td>AdaptRate</td></tr><tr><td></td><td>User Data Rate</td><td>1000 Mbps</td><td>100 Mbps</td></tr><tr><td>Link Budget for 10<sup>-6</sup> B.E.R. w/ 12" (30cm) Antennas</td><td></td><td>168 dB</td><td>178 dB</td></tr><tr><td>Link Budget for 10<sup>-6</sup> B.E.R. w/ 24" (60cm) Antennas</td><td></td><td>182 dB</td><td>192 dB</td></tr></table>				Operating Mode	Normal	AdaptRate		User Data Rate	1000 Mbps	100 Mbps	Link Budget for 10 <sup>-6</sup> B.E.R. w/ 12" (30cm) Antennas		168 dB	178 dB	Link Budget for 10 <sup>-6</sup> B.E.R. w/ 24" (60cm) Antennas		182 dB	192 dB
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INTERFACES	Ethernet: Physical layer: SFP, 1000Base-X, single mode (-LX) or multi-mode (-SX) fiber, 1000Base-T with RJ45 connector – CAT5e or CAT6 cable																		
NETWORKING	Quality of Service per IEEE 802.1p, DSCP and port based Scheduling: 8 queues allowing user configurable Strict Priority or Shaped Deficit Weighted Round Robin (SDWRR) MEF compliant traffic policing (two rate, three color scheme) VLAN per IEEE 802.1q, up to 4096 VLANs Provider Bridge Q-in-Q per IEEE 802.1ad Synchronous Ethernet (SyncE) per ITU-T G.8261, G.8262 and DNU section of G.8264 Precision Time Protocol (PTP) per IEEE1588.v2 (-2008) – Distributed transfer of clock to avoid variable asymmetric link delays Congestion Management: WRED and Tail Dropping Ethernet Protection: Ring per G.8032, Linear per G.8031 Maximum Ethernet frame length: Jumbo packets up to 10,000 bytes MAC Layer: Supports MAC Learning, MAC Switching, MAC Ageing Link State Propagation: Rapid Link Shutdown (RSP) supports remote port LSP																		
LATENCY	Dependent on configuration, as low as 30 µSec																		
SECURITY	Inherently secure ultra-narrow beamwidth antennas for low probability of detection and interception Option: FIPS-197 certified 256-bit AES Encryption (export controlled)																		
MANAGEMENT	Web-based (HTTP/HTTPS) embedded management agent; Console Interface (CLI/SSH); IPv6 SNMP Support: MIB-II and BridgeWave enterprise MIB, SNMP V1, V2C, V3 SysLog (RFC 3164, RFC 3195) event support; RADIUS RFC2865 client support Ethernet OAM per 802.3ah (Link OAM), 802.1ag (Configuration Fault Management), Y.1731 (Performance Monitoring) Loopbacks: Ethernet (per port, per direction), Local Modem Test																		
POWER	-48 VDC input, -37.5v to -60v range; 35 watts power consumption (depending on number and type of SFPs) Power over Ethernet up to 328 ft (100 m) CAT5e/CAT6 cable separation																		
SIZE & WEIGHT	13.0" w x 8.6" h x 2.5" d (33.0 cm x 21.9 cm x 6.4 cm); 6.5 lbs (3 kg) (excluding antenna and mount)																		
ENVIRONMENTAL	Operating Temperature: -33°C to +55°C (-27°F to +131°F) per EN 300 019-2-4 Humidity: 100% all-weather operation Operating Altitude: Up to 5,000 m (16,405 ft) Water Ingress: IP66 RoHS & WEEE Compliant																		
REGULATORY	RF Certifications: U.S. FCC Part 101 Subpart C; EN 302 217-3 Safety: CE Mark; 60950-1; EN 60950-22; meets FCC 1.307 General Population & EN 62311 RF MPE limits EMC/EMI: EN 301 489-4; FCC Part 15 Class B Surge & Immunity: EN 301-489-1																		
ANTENNAS	12" (30 cm) Parabolic or 24" (60 cm) Parabolic – see antenna data sheet for specifications																		

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040-57006 Rev 3

www.4Gon.co.uk info@4gon.co.uk Tel: +44 (0)1245 808295 Fax: +44 (0)1245 808299

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