Advanced MIMO OFDM Radio
CableFree Amber Crystal: MIMO AC 2x2

Overview

About Wireless Excellence

Founded in 1996 and with headquarters in Oxford UK, Wireless Excellence Limited is a leading designer and supplier of outdoor and indoor Broadband Wireless communication products.

With a complete range of solutions including Radio, Microwave, Millimeter-Wave, Free Space Optics, WiFi and 4G/5G/LTE, customers in over 80 countries have chosen Wireless Excellence as the “one stop shop” solution of choice for dependable wireless networking.

About Our OFDM Range

CableFree OFDM Radio solutions deliver the performance, reliable connectivity, and cost-effectiveness that are crucial to modern wireless broadband networks. Our scalable wireless platform delivers superior performance even in demanding conditions, with the flexibility and features to enable a wide range of applications. CableFree OFDM Radio technology combines the best hardware and software technology to ensure best possible network performance.
**System Features**

- Advanced MIMO OFDM Radio Platform
- Raw data rates up to 867 Mbps using 2x2 MIMO OFDM
- 5.1-5.8 GHz ISM bands
- Supports extended 4.9-6.0 GHz licensed bands
- Range up to 40 km*
- Data Throughput up to 530-650 Mbps*
- Carrier-class OS and resiliency features
- Power-over-Ethernet technology
- Rugged environmental IP67 waterproof enclosure
- 200Km/h Wind Resistance
- Near & Non-LOS Operation
- 2 x 2 MIMO Support
- Modulation up to 256QAM
- Network interfaces 2x 10/100/1000 GigE
- Optional Fibre Optic SFP Interface with SingleMode (SM), MultiMode (MM), CWDM & DWDM fibre options

*Depends on radio environment and antennas

**Applications**

- Point-to-Point or Point-to-Multipoint Data network segments
- Wireless ISP or Hotspots
- Resilience for FSO or Fibre links
- Fast Roll-out & Temporary Deployment

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**Embedded Router Platform**

CableFree OFDM radios from Wireless Excellence are high-performance carrier-grade Radio Solutions. They embody state-of-the-art software-defined-radio hardware, coupled with a powerful carrier-class router operating software with advanced Layer 2 Bridging and Layer 3 Routing features:

- High performance CPU, 533 MHz MIPS architecture
- IP Bridging
- Layer 3 IP Routing
- Advanced Networking features

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**Enhanced Wireless Performance**

CableFree OFDM radios from Wireless Excellence offer major advantages over competing radio products. Examples are:

- Highly configurable – up to 2 or 4 radio cards depending on version
- 867 Mbps raw data rate using 2x2 MIMO features offers up to 530-650 Mbps throughput
- MIMO OFDM Software-defined radio – ‘state-of-the-art’ radio using powerful DSP technology
- Sophisticated Linux-Based software platform
- Extensible Feature Set
### Specifications

<table>
<thead>
<tr>
<th>System Variant</th>
<th>Amber Crystal: WIHPR-MIMO AC2</th>
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#### Performance

<table>
<thead>
<tr>
<th>Range</th>
<th>Up to 40km or more with suitable external antennas</th>
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<tbody>
<tr>
<td>Bandwidth</td>
<td>bandwidth up to 530Mbps (867Mbps raw speed) in AC 2x2 MIMO mode</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>10W, 18V (or 48V factory option) fed from Power-over-Ethernet injector; 115/230Vac, optional Uninterruptible Power Supply (UPS)</td>
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<tr>
<td>Operating Temp</td>
<td>-40...+60 deg C</td>
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**Wireless**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>5GHz: 5.150-5.350 (5 MHz step) 5.725-5.825 (5 MHz step) 5.47-5.725 GHz, 4.90-6.00GHz DFS (Dynamic Frequency Select) feature for regions requiring DFS enabled</th>
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<tbody>
<tr>
<td>Radio Type</td>
<td>Direct Sequence Spread Spectrum (DSSS)</td>
</tr>
<tr>
<td>Modulation</td>
<td>5GHz: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256QAM); Dynamic (Adaptable to Conditions)</td>
</tr>
<tr>
<td>RF Channels</td>
<td>Software Selectable 5, 10, 20, 40, 80MHz; also custom channel widths available</td>
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<tr>
<td>Latency</td>
<td>&lt;3ms</td>
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<tr>
<td>RF Output Power</td>
<td>18dBm (63mW, standard power) or 28dBm (630mW, high power version) – TPC (Transmit Power Control), 1dB steps under software control. Minimum power 0dBm</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>54 Mbps OFDM -73 dBm; 48 Mbps OFDM -76 dBm; 36 Mbps OFDM -82 dBm; 24 Mbps OFDM -85 dBm; 18 Mbps OFDM -88 dBm; 12 Mbps OFDM -89 dBm; 11 Mbps OFDM -91 dBm; 9 Mbps OFDM -90 dBm; 6 Mbps OFDM -91 dBm; 5.5Mbps OFDM -92 dBm; 2 Mbps OFDM -93 dBm; 1 Mbps OFDM -94 dBm</td>
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**Radio Data Rate**

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<tr>
<th>Radio Data Rate</th>
<th>5GHz (Normal mode): 54, 48, 36, 24, 18, 12, 9, 6 Mbps, auto-fallback</th>
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<tr>
<td></td>
<td>5GHz (N.2X2 mode): 300, 270, 240, 180, 120, 90, 60, 30 Mbps, auto-fallback</td>
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<tr>
<td></td>
<td>5GHz (AC 2X2 mode): 867, 780, 650, 585, 520, 390, 260, 195, 130, 65 Mbps, auto-fallback</td>
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**Compatibility**

Proprietary modes plus back compatibility fully interoperable with IEEE 802.11a/b/g compliant products

**Radio Architecture**

Support ad-hoc, peer-to-peer networks and infrastructure communication to wired Ethernet networks via Access Point

**Security**

64/128-bit WEP data encryption; WPA, WPA2, TKIP, CCMP, AES; Proprietary modes

**Antenna**

For use with External Antennas - 2xN connectors

**Router Platform**

533MHz up to 720MHz MIPS CPU; 128MB SRAM; 8MB FLASH Memory

**System Software**

CF-OS V1; Remotely Upgradable via TFTP

**Management**

Local and Remote configuration, control and administration via Telnet, SSH, HTTP, SNMP protocols

**Resilience Features**

Network configurations with multiple units allows two complete radio ODUs to be configured with one in ‘hot standby’ for high-availability applications

**Mechanical**

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<thead>
<tr>
<th>Dimensions (mm)</th>
<th>300x220x55mm</th>
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<tr>
<td>Connectors</td>
<td>External: 10/100/1000 Ethernet: RJ45 ; Optional N connectors for optional second radio feature ; Optional SFP Fibre Optic Interface module.</td>
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<td>Environmental Weight</td>
<td>2kg</td>
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**Part Numbers**

<table>
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<tr>
<th>Product Code</th>
<th>Description</th>
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<tr>
<td>HPR-MIMO-AC2-B-1-2/55</td>
<td>P2P HPR 2x2 MIMO Bundle, 4 9-6.0GHz, Complete Link, 867Mbps, 10/100/1000 POE Interface, 2xN connectors for External antennas</td>
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<tr>
<td>Integrated Antenna Version</td>
<td>See IHPR-MIMO-AC2 datasheet</td>
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