

## Microwave Radio (MW)

# CableFree Diamond - High Capacity Full Outdoor Microwave Radio Overview



### About CableFree

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 Microwave

Using the latest RF technology, our microwave links operate in all the popular bands from 4-42GHz, distances over 40km and net throughput up to 4Gbps full duplex.

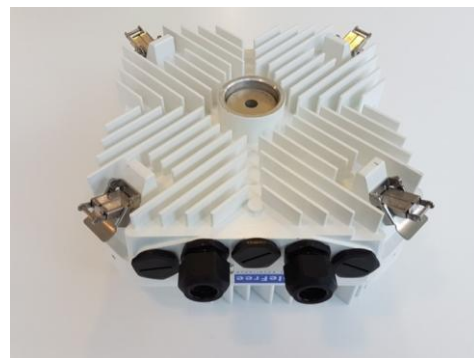
Our advanced Full-Outdoor Microwave Radio provides a platform with IP/Gigabit Ethernet interfaces, with Power-Over-Ethernet technology to ensure simplicity of installation in zero-footprint deployment scenarios.

Flexibility, performance and low cost of ownership are ensured.

## CableFree Diamond: Full-Outdoor High Capacity Microwave IP Radios

CableFree Diamond is a Dual-Core, Dual-Carrier High Performance microwave radio platform supporting licensed and unlicensed frequencies in the common 6-42 GHz bands. Using advanced modulation techniques up to 2048QAM, native IP/Ethernet traffic up to 2Gbps (Stacked 4+0 gives 4Gbps) full duplex capacity can be transmitted reliably.

Microwave radio is an established technology used by telecommunication operators and organizations where quality of service is ensured through careful frequency and link planning. Wireless Excellence Microwave Radios are distinguished by high performance, advanced radio features and flexible reconfigurable network interfaces.



### System Features

- Compact, All-Outdoor High Power Configuration
- Spectrally Efficient, Software-Defined 2048QAM Radio
- Dual-Core / Dual Carrier Microwave with XPIC (Cross Polar Interference Cancellation) Technology
- Powerful Forward Error Correction (FEC)
- Adaptive Coding & Modulation (ACM), Adaptive Power Control (APC)
- Capacity up to 2Gbps Full Duplex (stacks to 4Gbps+)
- Native IP/Gigabit Ethernet POE & SFP Interfaces
- Rugged & proven telecom-grade design
- 1+0, 1+1, 2+0, Dual 1+0, & 4+0 configurations
- Rapid Spanning Tree (RSTP), QinQ, Jumbo Frame (9600 byte) support, Sync-E Synchronisation
- Licensed & Unlicensed (17, 24GHz) band supported

### Applications

- Telecom Service Providers & ISPs
- 4G Backhaul for Cellular Network operators
- Point-to-Point Wireless networking
- CCTV backhaul for multiple cameras
- Corporate backbone links
- Resilience for Fibre links
- Fast Roll-out & Temporary Deployment

### Enhanced Performance, Flexibility & Features

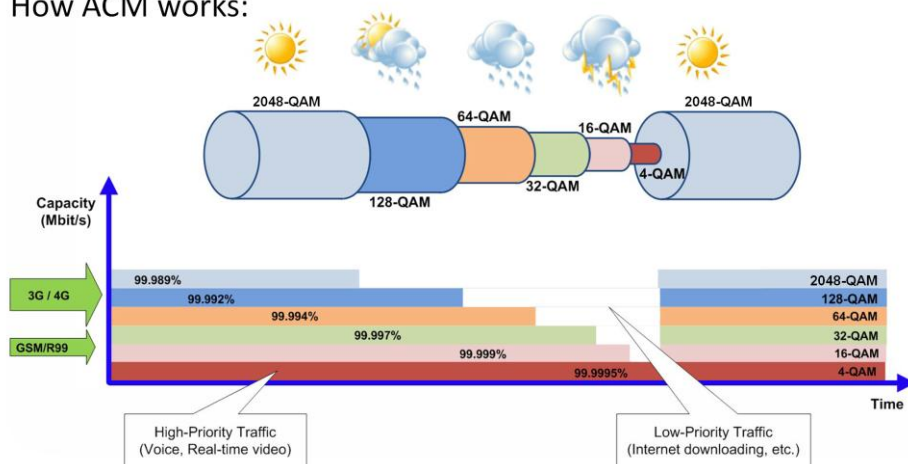
CableFree Diamond Microwave radios are high performance, modern generation wireless networking platforms supporting IP/Ethernet interfaces, operating in licensed and unlicensed frequency bands and capacities up to 2Gbps (or 4Gbps using dual radio) or even higher aggregation.

CableFree has pioneered the use of Software-Defined Radio, which enables in-service upgrades, remote configuration, low equipment costs. Advanced features such as Adaptive Coding and Modulation (ACM) ensure maximum uptime for ISPs and other customers who have to offer SLA's based on uptime, or are limited on antenna size for difficult sites.

Advanced carrier-centric features such as Rapid Spanning Tree are included, as well as Synchronisation features such as Synchronous Ethernet (SyncE). QoS and QinQ VLAN features are standard.

Operating distances vary depending on local weather conditions, specifically link frequency and rain intensity. Planning for microwave wave spectrum use must take into account the propagation characteristics of radio signals at this frequency range. CableFree 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 100km are possible when correctly designed, specified and deployed.

#### How ACM works:



## Wide range of frequencies and bands available

CableFree Full Outdoor Microwave radios are available in all commonly-used frequency bands worldwide. The Full-outdoor radios allow for current shipping plus future bands supported with the platform. Examples include:

	Licensed Frequency Bands (GHz)										Unlicensed Bands (GHz)	
	(18 & 26GHz currently shipping: Please enquire for other bands)											
Band	6U	7	8	11	13	15	18	23	26	38	17	24
Frequency Range	7.1-7.9	7.1-7.9	7.9-8.5	10.7-11.7	12.7-13.3	14.4-15.4	17.7-19.7	21.2-23.6	24.2-26.5	37.0-40.0	17.1-17.3	24.0-24.25

## Specifications

System Variant	CFMW-DIAMOND-2048QAM-O-X2
<b>System Parameters</b>	
Frequency Band	6U, 7, 8, 11, 13, 15, 18, 23,26 GHz Licensed Bands (Factory set to within a sub-band) 7, 24 GHz Unlicensed Bands supported
Bandwidth	CEPT/ETSI: 7, 14, 28, 56, 112MHz. (Note: 112MHz supported where allowed) ANSI/FCC: 10, 20, 30, 40, 50, 60, 80MHz
Capacity	2Mbps up to 2Gbps Full duplex net throughput (2Gbps FDX uses 112MHz channels) Note 17GHz & 24GHz reduced channel width dictates lower capacity
Modulation Type	QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM, 2048QAM
Rx Sensitivity	Depends on specific modulation used
Output Power	Up to 27dBm – depends on specific version and modulation.
Forward Error Correction	Trellis-Coded Modulation concatenated with Reed-Solomon Coding.
Network Management	SNMP Enabled
Remote Parameters Monitoring	Full range of SNMP, HTTP/web, CLI, serial
Advanced Radio Features	Adaptive Coding and Modulation (ACM) (QPSK to 1024 QAM), ATPC, OoS
Radio Configurations	1+0, 1+1, 2+0, XPIC, Dual 1+0
Network Synchronisation	Synchronous Ethernet (ITU-T G.8261/G.8262/G.8264 ESMC),
<b>Data Interface</b>	
IP/Ethernet Interface	100Base-T, 1000Base-T (Standard IEEE 802.3) with proprietary High-Power-over-Ethernet, Optical (SFP), with wide choice of optical SFP modules.
<b>Antenna</b>	
Antenna Type	Parabolic antenna with radome – 30cm up to 3m – please see separate datasheet
Antenna Gain/ beamwidth	Depends on specific antenna and frequency chosen – see appropriate antenna data
<b>Power / Environment</b>	
DC Power	-40 to -60 Volts DC (-48V typically)
Power Consumption	<60W (depends on specific model)
Operational Temperature	-20°C to 55°C ETS 300 019-2-4 Class 4M5
Humidity	0 to 95%, non-condensing
<b>Physical Dimensions</b>	
Dimensions (Radio only)	300x300x150mm (TBC)
Dimensions (POE box)	170x150x39mm
Weight (Radio, POE)	7.1 kg (Radio), 0.5kg (POE box)

## Product codes

Product Code	Description	
CFMW-Diamond-2048QAM-O-X2-xxxx	Full Outdoor 2048QAM XPIC Microwave radio link 2+0 configuration including IP67-rated outdoor modem with Ethernet interfaces, IP67-rated outdoor unit, antennas, management software, Outdoor-rated Power-over-Ethernet Injector. Frequency License may be required	T: +44 (0870) 495 9169 E: sales@cablefree.net W: www.cablefree.net

Note – precise product code depends on frequency, band, antennas, resilience and other options. Please contact Wireless Excellence for more information

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