

Microwave Radio (MW)

CableFree MMR - Modular Microwave Radio

Datasheet



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 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 400Mbps or 1Gbps 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 Modular Microwave Radios 4-42GHz

System Features

- Compact, split Indoor-Outdoor configuration
- Spectrally Efficient, Software-Defined IDU
- Powerful Forward Error Correction (FEC)
- Adaptive Power Control (APC, ATPC)
- ACM (Adaptive Coding & Modulation)
- XPIC fully supported – optional feature
- Capacities of 364, 728Mbps and higher
- Mix SDH, PDH and IP/Ethernet Interfaces
- Rugged & proven telecom-grade design
- 1+0, 1+1, ring, star and mesh architectures
- Scales up to 2+0, 4+0, 8+0 for Nodal Solution

Applications

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

Enhanced Performance, Flexibility & Features

CableFree Microwave radios are high performance, modern generation wireless networking platforms supporting mixed IP/Ethernet, SDH and PDH interfaces, operating from 4 to 42GHz frequency bands and payloads from 16 to 364, 728Mbps and higher up to 2.9Gbps with N+0 carrier aggregation, and Clustering to provide flexible Nodal Solution for high capacity networking. Wireless Excellence has pioneered the use of Software-Defined Radio which enables in-service upgrades, remote configuration, low equipment costs. CableFree Microwave systems offer users maximum useful lifespan and minimal capital and operating expenditure (CAPEX and OPEX). Advanced networking features in the CableFree Microwave IDU include scalable Ethernet capacities up to 1.5Gbps, SDH support and PDH switching to add/drop up to 160 E1 channels between “East”, “West” and “Front Panel” ports which radically reduces costs and increases flexibility in a modern cellular network operator network, with ring, star and mesh configurations. High availability configurations include 1+1 protection. 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. While signals at lower frequency bands can propagate for tens of miles, higher frequency microwave signals can travel only a few miles or less. Higher frequency microwaves can permit more densely packed communications links, with very efficient spectrum utilization.

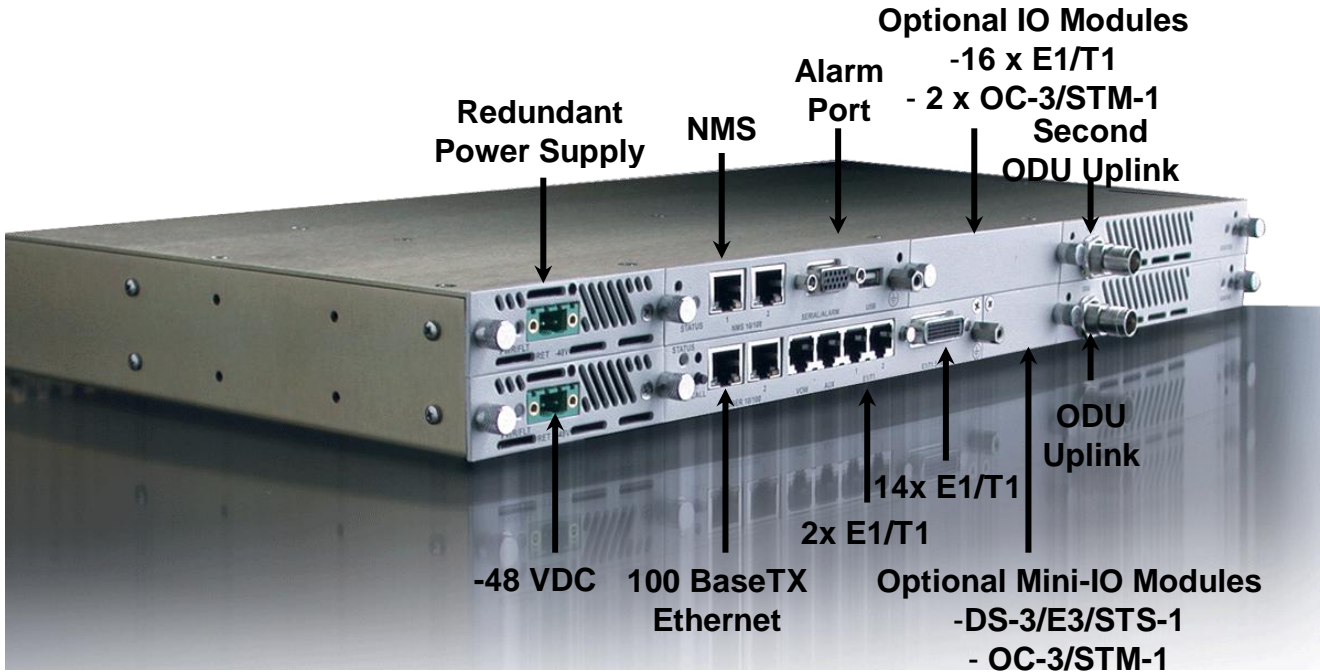
The ATPC feature adapts transmit power to fade conditions, increasing transmit power in high “fade” (e.g. rainfall). The optional ACM (Adaptive Coding and Modulation) feature increases link availability by adjusting modulation scheme in heavy fade to ensure link remains “up” but with reduced throughput. This enables operators to offer high availabilities or to use smaller antennas especially on sites where antenna sizes may be constrained by aesthetics, tower loading, cost or landlord permissions.

The optional XPIC feature enables dense aggregation of channels using both polarities on an antenna within a single channel allocation

Flexible Modular System Configuration

CableFree Microwave radios from Wireless Excellence feature a scalable, flexible Indoor Unit platform. The IDUs can be configured with single or dual ODU uplinks for 1+1 resilient links or 2+0 repeater sites; Dual Redundant power options; additional E1/T1 or SDH network modules. The modular design allows for Gigabit Ethernet capacities with per-carrier capacities of up to 364Mbps available. Multiple IDUs can be aggregated for N+0, N+1 and N+N configurations up to 2.9Gbps. The flexible “mix and match” choice of network interfaces allows for any combination of:

- 1-100 Mbps full duplex Ethernet (scalable to multiple rates)
- Gigabit Ethernet 364 or 728Mbps up to 1.5Gbps full duplex
- Carrier Ethernet features: SyncE, IEEE1588v2, VLAN, MSTP, LACP, Ethernet Path/Ring Protection, MEF9, MEF14
- 1-63 x E1/T1 or higher via expansion
- 1-3 x STM-1 Electrical or Optical / OC-3. SFP optical modules including CWDM and DWDM options
- STM1 to E1/T1 Mux/Demux integrated in a single IDU (ADM option)
- 2.9Gbps with multiple IDUs and 8+0 link aggregation
- Nodal Solution using Clustering for Multi-Direction nodal sites



Example of CableFree MMR IDU in Dual-Modem 1U configuration. Units can be "clustered" for Nodal Solutions.

Common customer configuration examples include:

- Nx 100 Mbps full duplex Ethernet + 16 x E1/T1
- 364, 728Mbps or 1.5Gbps full duplex Gigabit Ethernet
- 2x STM-1 + Ethernet + 16xE1/T1
- Clustered Nodal solution for 4+0, 4+4, 8+0 and Multi-Direction applications

There are a large number of combinations, which can be upgraded in the field via plug-in modular upgrades. This flexibility is ideal in a modern service provider environment, handling mixed IP and TDM traffic, for example GSM, 3G & 4G/LTE base stations, plus WiFi hotspot overlay.

The CableFree Modular Microwave IDU works alongside a complete range of Outdoor Units (ODU) for various frequency bands. The ODU determines the frequency band supported. Examples include:

	Frequency Band (GHz)														
Band	4	6L	6U	7	8	11	13	15	18	23	26	28	32	38	42
Frequency Range	4.4-5.0	5.9-6.4	6.4-7.1	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	27.5-29.5	31.8-33.4	37.0-40.0	40.5-43.5

Typical capacities using ETSI-recommended modes of operation for IP, PDH and SDH payloads include:

Modulation Type	Channel Bandwidth (MHz)			
	7	14	28-30	40-56
QPSK	4E1 8Mbps	8E1 16Mbps	16E1, E3 34Mbps	-
16QAM	8E1 16Mbps	16E1, E3 34Mbps	2E3 68Mbps	STM-1 155.52 Mbps
32QAM	8E1 16Mbps	16E1, E3 34Mbps	2E3 68Mbps	STM-1 155.52 Mbps
64QAM	-	-	-	STM-1 155.52 Mbps
128QAM	-	-	STM-1 155.52 Mbps	2x STM-1 311.04 Mbps
256QAM	-	-	-	360-364 Mbps

Note: there are many other operating modes in addition, please see detailed documentation for information

Specifications

System Variant	CF-MMR-XX
System Parameters	
Frequency Band	4, 6L, 6U, 7, 8, 10/11, 13, 15, 18, 23, 26, 28, 32, 38, 42GHz depends on ODU
Bandwidth	7, 14, 28-42, 40-56MHz depends on ODU
Capacity	16 up to 364 or 728Mbps Full duplex, multiple-IDU aggregation up to 2.9Gbps
Modulation Type	BPSK, QPSK, 16 up to 256QAM
Rx Sensitivity	Depends on specific ODU and modulation
Output Power	Up to 31dm – depends on specific ODU type, band and modulation
Forward Error Correction	Trellis-Coded Modulation concatenated with Reed-Solomon Coding.
ACM Support	Adaptive Coding and Modulation – fully supported – optional feature
XPIC support	Cross Polar Interference Cancellation - fully supported - optional feature
Network Management	SNMP Enabled
Remote Parameters Monitoring	Full range of SNMP, HTTP/web, CLI, serial
Data Interface	
IP/Ethernet Interface	100Base-T (Standard IEEE 802.3), optional 1000Base-T Gigabit Ethernet and Optical Gigabit Ethernet. Optional Carrier Ethernet Module
PDH	Nx E1/T1 120ohm twisted pair (ITU G.703) up to 63E1 or higher
SDH	1-3x STM-1 Copper or Optical (SFP) interfaces
Diagnostics Port	10/100Base-T and RS-232
Antenna	
Antenna Type	Cassegrain type antenna with radome. Single and Dual-polarised options.
Antenna Gain/ beamwidth	Depends on specific antenna and frequency chosen
Power / Environment	
DC Power	36 to 60 Volts DC
Power Supply AC	Input 88-132 / 176-264 Volts, 50/60 Hz [with manual voltage range switch]
Power Consumption	50-75W (depends on ODU type)
Power Connector Ethernet / Power Connector	IP-65 [optional IP-68]
Operational Temperature (IDU)	-10°C to 60°C
Operational Temperature (ODU)	-33°C to 55°C ETS 300 019-2-4 Class 4M5
Humidity	0 to 95%, non-condensing
Physical Dimensions	
Dimensions (IDU)	1RU, ETSI compliant
Dimensions (ODU no antenna)	267 diameter x 89mm
Weight (IDU)	5 kg max
Weight (ODU no antenna)	5 kg max

Product codes

Product Code	Description
CFMW-MMR-IO-xxx -N+M-xxxx	CableFree Modular Microwave Radio, please specify configurations including N+M options, STM-1 and Ethernet interfaces, Space Diversity and other resilience options, Frequency band, Power supplies. Frequency License required

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

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