

Microwave Radio (MW)

CableFree HCR - High Capacity Microwave Radio

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 Microwave

Using the latest RF technology, our microwave links operate in all the popular bands from 4-42GHz, distances over 100km and net throughput up to 890Mbps and some models up to 8Gbps. Our advanced Indoor units provide a common platform with flexible IP/Ethernet, Gigabit Ethernet, PDH (16xE 1/T1) and optional SDH interfaces, to which traffic can be allocated under software control. Flexibility, performance and low cost of ownership are ensured.

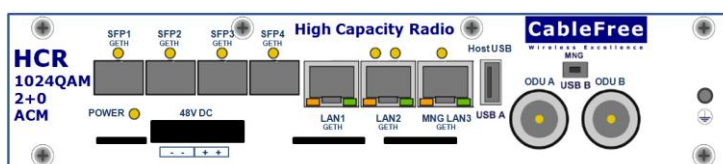
CableFree High Capacity Microwave Radios 4-42GHz

System Features

- Compact, split Indoor-Outdoor configuration
- Spectrally Efficient, Software-Defined IDU
- Up to 2048QAM Modulation for high capacity
- 2+0 as standard: Two modems are included
- Powerful Forward Error Correction (FEC)
- Adaptive Power Control (APC, ATPC)
- ACM (Adaptive Coding & Modulation) - True hitless and errorless implementation
- XPIC fully supported - standard feature
- Optional AES 128/256 Encryption Options for security
- Online Ethernet L1 header compression
- Capacities of 1Gbps and higher
- Can mix IP/Ethernet and PDH/E1 Interfaces
- Rugged & proven telecom-grade design
- 1+0, 2+0, 1+1, ring, star and mesh architectures
- FD, SD and HSB modes supported: Frequency Diversity, Space Diversity and Hot Standby modes
- Scales up to 4+0, 8+0 for Nodal Solution

Applications

- Telecom Service Providers & ISPs
- 4G/LTE 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



CableFree HCR IDU: Powerful and Compact, 1024QAM Dual Modems for 2+0 support XPIC as standard

Enhanced Performance, Flexibility & Features

CableFree Microwave radios are high performance, modern generation wireless networking platforms supporting mixed IP/Ethernet and PDH interfaces, operating from 4 to 42GHz frequency bands and payloads from 16 to 480Mbps, 1Gbps and higher up to 3.5Gbps 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, which radically increases capacity and 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 integrated hitless and errorless 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 integrated XPIC feature enables dense aggregation of channels using both polarities on an antenna within a single channel allocation

Flexible 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 high capacity links; Dual Redundant power options; additional E1/T1 network modules. The design allows for Gigabit Ethernet capacities with per-carrier capacities of up to 480Mbps available. Multiple IDUs can be aggregated for N+0, N+1 and N+N configurations up to 3.5Gbps. East-West Repeater configurations are possible. A flexible “mix and match” choice of network interfaces allows for any combination of:

- Gigabit Ethernet 470 or 940Mbps up to 1.5Gbps full duplex (aggregate)
- Carrier Ethernet features: SyncE, IEEE 1588v2, VLAN, MSTP, LACP, Ethernet Path/Ring Protection, MEF9, MEF 14
- 1-16 x E1/T1 or higher via expansion EMM module

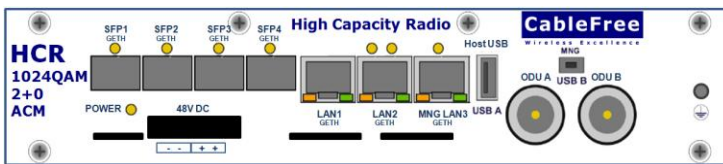
- Potential 3.5Gbps with multiple IDUs and 8+0 link aggregation
- Supports various configurations including:
 - 1+0 (single modem)
 - Split 1+1 FD/HSB/SD protection
 - 1+0 dual East and West (star or repeater site topology)
 - 2+0 Frequency Diversity (FD)/XPIC aggregation
 - 1+1 Frequency Diversity (FD)/Hot Standby (HSB)/Space Diversity (SD)/XPIC protection
 - Split 1+1 FD/HSB/SD protection
 - Split 2+2 XPIC&FD/HSB/SD aggregation & protection
- Nodal Solution using Clustering for Multi-Direction nodal sites

Common customer configuration examples include:

- Nx 100 Mbps full duplex Ethernet + 16 x E1/T1
- 470, 940Mbps or 1.3Gbps full duplex Gigabit Ethernet using 2+0 XPIC
- 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.

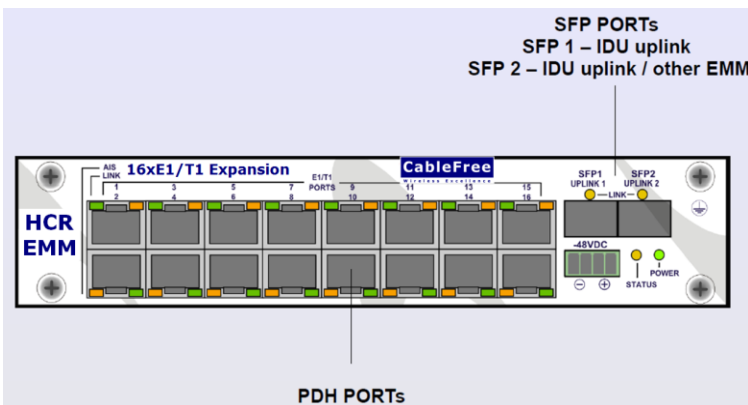
Front panel of CableFree HCR IDU:



The CableFree HCR IDU has multiple interfaces including

- 4x SFP slots, ideal for Optical SFP modules or Additional Copper RJ45 GBE interface modules
- 3x LAN connections with Copper RJ45 interfaces, one for management
- USB connectors for local management via laptop
- Two ODU IF connectors for direct connection to 1x or 2x CableFree Microwave ODUs
- 48V DC power input connector

CableFree HCR allows expansion with optional HCR-EMM Module, which adds 16x E1/T1 ports to the radio configuration



Wide range of frequency bands supported

The CableFree HCR Microwave IDU works alongside a complete range of CableFree 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)		
	14	28	56
QPSK	23 Mbps	46 Mbps	94 Mbps
16QAM	46 Mbps	93 Mbps	188 Mbps
32QAM	57 Mbps	116 Mbps	235 Mbps
64QAM	69 Mbps	140 Mbps	282 Mbps
128QAM	80 Mbps	163 Mbps	330 Mbps
256QAM	92 Mbps	187 Mbps	376 Mbps
512QAM		210 Mbps	423 Mbps
1024QAM		233 Mbps	470 Mbps
2048QAM		TBC	TBC

For 2+0 operation, DOUBLE these values can be achieved using the HCR IDU, which aggregates 2 channels using XPIC

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

Specifications

System Variant	CF-HCR-2048QAM
System Parameters	
Frequency Band	4, 6L, 6U, 7, 8, 10/11, 13, 15, 18, 23, 26, 28, 32, 38, 42GHz depends on ODU
Bandwidth	14, 28, 56MHz (ETSI), 10, 20, 25, 30, 40, 50, 60, 80MHz (ANSI): software control
Capacity	16 up to 364 or 728Mbps Full duplex, multiple-IDU aggregation up to 2.9Gbps
Modulation Type	BPSK, QPSK, 16 up to 2048QAM
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: SNMP v.1, SNMP v.2c, SNMP v.3. Web interface. CLI
Remote Parameters Monitoring	Full range of SNMP, HTTP/web, CLI, serial
Data Interface	
IP/Ethernet Interface	1000Base-T Gigabit Ethernet (3) and Optical SFP (4) Gigabit Ethernet ports
PDH	Nx E1/T1 120ohm twisted pair (ITU G.703) up to 16E1 or higher on optional external expansion unit (not integrated into base model IDU)
Diagnostics Port	10/100/1000Base-T and USB ports
Antenna	
Antenna Type	Wide choice of antenna options. Single and Dual-polarised options.
Antenna Gain/ beamwidth	Depends on specific antenna and frequency chosen
Power / Environment	
DC Power	36 to 72 Volts DC
Power Supply AC	Input 88-264 Volts, 50/60 Hz [using external optional AC-DC PSU]
Power Consumption	50-75W (depends on ODU type). Optional dual redundant power configuration.
Operational Temperature (IDU)	-5°C to +45°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, narrow unit 220 x 204 x 44mm
Dimensions (ODU no antenna)	267 diameter x 89mm
Weight (IDU)	2.2 kg max
Weight (ODU no antenna)	5 kg max

Product codes

Product Code	Description
CFMW-HCR-IO-xxx -N+M-xxxx	CableFree High Capacity 2048QAM Microwave Radio, please specify configurations including N+M options, and Ethernet interfaces, Space Diversity and other resilience options, Frequency band, Power supplies. Frequency License required

Note – precise product code depends on frequency, band, antennas, resilience and other options. Please contact Wireless Excellence for more information
Due to policy of continuous product improvement, specifications may change without notice

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