Datasheet

WIRELESS EXCELLENCE

Millimeter-Wave Radio (MMW)

MMW Radio – 60 & 70/80GHz, 1.2 & 2.5Gbps CPRI/OBSAI Interface

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 WiMax solutions, customers in over 60 countries have chosen Wireless Excellence as the "one stop shop" solution of choice for dependable wireless networking.

About Millimeter-Wave

CableFree MMW links offer high performance connections using Millimeter Wave frequencies. MMW is a high frequency microwave technology offering bandwidths of up to 1.5Gbps Full Duplex capacity.
Millimeter Wave technology is complimentary to FSO (Free Space Optics) and ideal for dense urban areas where radio spectrum is congested.
Planning for Millimeter Wave is based on rainfall, giving useful transmission distances of many kilometres.

System Features

- Capacity 1.228, 1536 & 2.457Gbps Full Duplex
- CPRI and OBSAI-complaint interfaces
- Versions for unlicensed 60GHz and semi-licensed 70/80GHz bands
- Range from 1.5 up to 20km*
- "Pencil beams" of 0.5 - 0.8degrees
- 20ns: Lower latency than fibre optics
- Rugged outdoor grade waterproof enclosure

Applications

- 4G/LTE Backhaul Infrastructure
- Remote Radio Head "Fronthaul" solution
- Locate 4G antennas remote from Base station
- Enable "Cloud-Based" 4G RAN
- Resilience for Fibre Optic links
- Fast Roll-out & Temporary Deployment
- Disaster Recovery – rapidly deploy radio heads

1.2 & 2.5GBps CPRI/OBSAI links for 4G/LTE using Millimeter Waves

Wireless Excellence is offering a range of high performance radios using millimeter-wave frequencies. Using high frequency microwave signals at 60GHz and above, large bandwidths of up to 2.5Gbps Full Duplex capacity can be provided.

Millimeter wave is a technology complimentary to Wireless Excellence established range of FSO (Free Space Optical) communication systems. Planning for Millimeter wave is based on rainfall, compared to FSO which is based on visibility, predominantly fog.

Wireless Excellence MMW-60-CPRI and MMW-70- CPRI are full-duplex Gigabit point-to-point links especially designed according to FCC and ETSI requirements. They provides interconnection between locations at up to 2.5Gbps with CPRI interfaces which is the standard for Remote Radio Heads for 4G/LTE Infrastructure, the evolving standard for switches and routers available from a variety of telecommunication equipment manufacturers.

The MMW-70- CPRI product has 10/100/1000Base T and optional 1000 Base-SX fibre optic connections at each end of the wireless link and operates as a transparent link. The resulting connection can replace a fibre-optics cable physically connected end-to-end. The wireless mm-wave Gigabit link provides fibre equivalent performance, reliability and security but with no high deployment cost associated with outdoor fibre installations.

The Gigabit Ethernet point-to-point millimeter wave radio links have been designed with compact parabolic Cassegrain antennas of 30 and 60 cm diameters, with narrow beam widths of 0.4 and 0.9 degrees which maximises signal margin across the link and ensures lack of interference from other links or sources.

The MMW-70-CPRI operating distances vary from 1.5 to 20 km for varying weather conditions depending of the link frequency and rain intensity. Planning for millimeter 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 many miles and penetrate more easily through buildings, millimeter wave signals can travel only a few miles or less. However, these characteristics of millimeter wave propagation are not necessarily disadvantageous. Millimeter waves can permit more densely packed communications links, thus providing very efficient spectrum utilization, and they can increase security of communication transmissions.

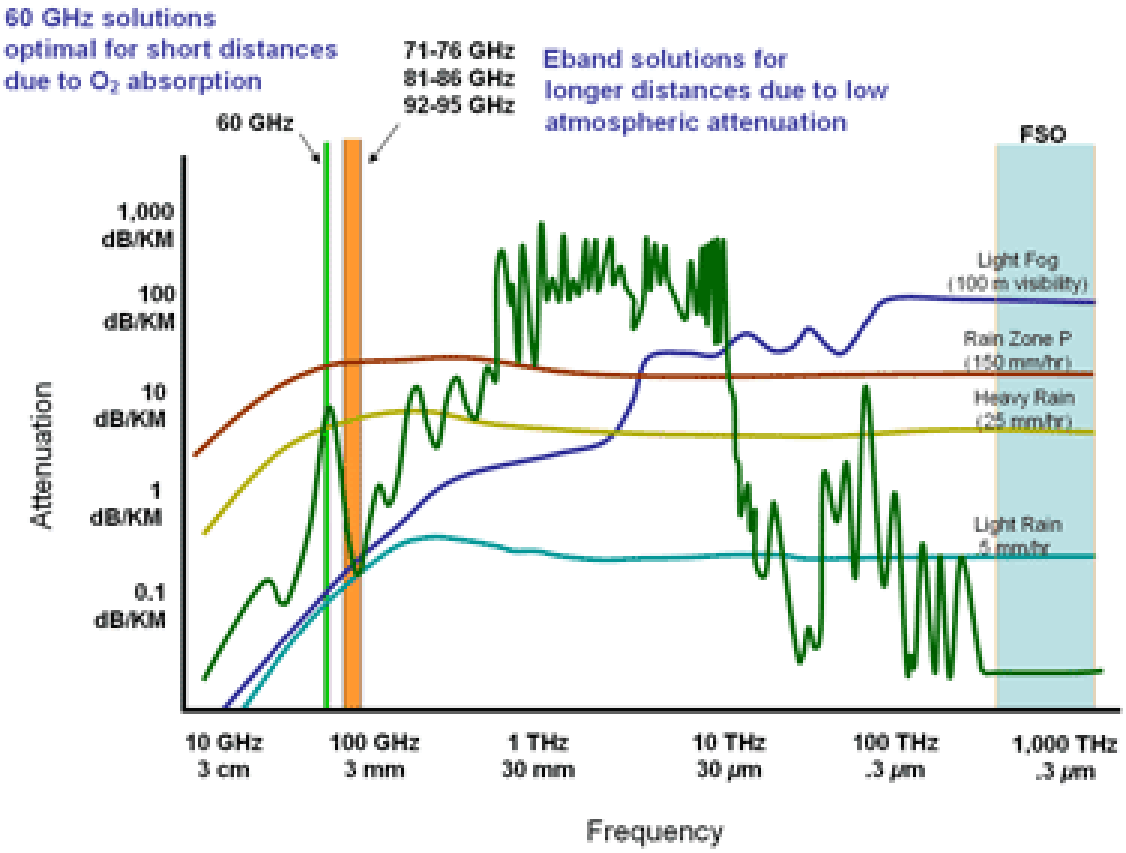
Operating distance limit for mm-wave communication

The spectrum between 30 GHz and 300 GHz is referred to as the millimeter wave band because the wavelengths for these frequencies are about one to ten millimeters. Millimeter wave propagation has its own peculiarities. This bulletin reviews the characteristics of millimeter wave propagation, including free space propagation and the effects of various physical factors on propagation. It was created to provide an easy to understand reference explaining the characteristics of radio signal propagation at millimeter wave frequencies and their implications for spectrum management.

The millimeter wave spectrum at 30-300 GHz is of increasing interest to service providers and systems designers because of the wide bandwidths available for carrying communications at this frequency range. Such wide bandwidths are valuable in supporting applications such as high speed data transmission and video distribution. Planning for millimeter 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 many miles and penetrate more easily through buildings, millimeter wave signals can travel only a few miles or less.

However, these characteristics of millimeter wave propagation are not necessarily disadvantageous. Millimeter waves can permit more densely packed communications links, thus providing very efficient spectrum utilization, and they can increase security of communication transmissions.

The following graph show the major distance advantage of the "E-band" over the 60GHz in terms of the Oxygen absorption peak. E-band links offer longer distances and higher availability than 60GHz links for this reason. Conversely, 60GHz can be used for shorter links sub-1km where dense re-use of the spectrum is intended



Product Features and Benefits

CableFree MMW products are highly robust and ruggedized for operation in harsh climates.

The highly integrated Full-Outdoor radio units are shipped with a choice of 30cm or 60cm antennas to meet customer network requirements.

Inside the radio unit there are connectors for user network interface and power. The default network interface for CPRI & OBSAI is an optical module using SFP optical interface for Multimode or Singlemode fibre interface with LC fibre optic connectors. Various choices of SFP area available to match customer network equipment and fibre installations.

The product supports CPRI interfaces at 1228.8Mbps and 2457.6Mbps as well as OBSAI at 1.536Gbps, which are the most common connection formats used for Remote Radio Heads for 4G/LTE Infrastructure. The connection is completely transparent with extremely low latency of a few tens or nanoseconds – around 30% less than fibre optic connections, due to the inherently low latency of wireless technology compared to fibre (direct LOS, and refractive index of 1)

The links are supplied with mounting brackets to mount the units on poles which are typically installed on walls, towers or roof top locations to ensure clear Line of Sight (LOS) between the end points of the wireless link.

.Alignment of the links is achieved using simple Digital Voltmeter connection to the radio unit as common with most microwave links and takes a skilled installer team typically 5-20 minutes.

When installed the links provide "fit and forget" connectivity between the nodes on the network and can be remotely managed and monitored using a choice of Web-based NMS and SNMP Management platforms.

Product Codes

Product Code	Description
CFMMW-70/80-CPRI-xx	70/80GHz E-band MMW Gigabit CPRI radio including IP65-rated outdoor unit, management software, Power supplies with mains 115/230Vac input. Does not include Ethernet cables.
CFMMW-60-CPRI-xx	60GHz MMW Gigabit CPRI radio including IP65-rated outdoor unit, management software, Power supplies with mains 115/230Vac input. Does not include Ethernet cables.
Options: -30 or -60	Antenna sizes 30 or 60cm

Specifications

System Variant	MMW-70/80-GE	MMW-60-GE
System Parameters		
Frequency Band	E band	60GHz band
Bandwidth	71-76 GHz & 81-86GHz	57-64 (FCC) or 59-66 (TELEC) GHz
Capacity	1228Mbps, 1536Mbps or 2457Mbps Full duplex	1228Mbps, 1536Mbps or 2457Mbps Full duplex
Modulation Type	ASK	ASK
Rx Sensitivity	-59 dBm (@ BER 1E-12 or error free)	-59 dBm (@ BER 1E-12 or error free)
Output Power	23dBm (200 mW)	10 mW
Forward Error Correction (FEC)	RS(255, 239) Optional Feature	RS(255, 239) Optional Feature
Network Management	Web based NMS, SNMP Features	Web based NMS, SNMP Features
Data and Aux Interface		
CPRI Interface	Optical SFP for Optical CPRI (singlemode & multimode fiber)	Optical SFP for Optical CPRI (singlemode & multimode fiber)
Diagnostics Port	RS-485 [with optional RS-232]	RS-485 [with optional RS-232]
Antenna		
Antenna Type	Cassegrain type antenna with radome	Cassegrain type antenna with radome
Antenna Gain/ beamwidth 60 cm	30cm: 45dBi, 0.9° beamwidth 60cm: 51dBi, 0.5° beamwidth	30cm: 42dBi, 1.2° beamwidth 60cm: 47dBi, 0.5° beamwidth
Power / Environment		
Power Supply AC	Input 88-264 Volts, 50/60 Hz	Input 88-264 Volts, 50/60 Hz
Power Consumption	20 W maximum	20 W maximum
DC Power	36 to 72 Volts DC, external AC supply option	36 to 72 Volts DC, external AC supply option
Power Connector Ethernet /	Internal connectors for Power and Ethernet	Internal connectors for Power and Ethernet
Operational Temperature	-30°C to +70°C	-30°C to +70°C
Humidity	0 to 95%, non-condensing	0 to 95%, non-condensing
Physical Dimensions		
Outdoor unit size w/o antenna	330 x 350 x 460 mm	330 x 350 x 460 mm
Weight (with ant, no bracket)	30cm: 1 kg (inc. antenna, no bracket) 60cm: 5kg (inc. antenna, no bracket)	30cm: 1 kg (inc. antenna, no bracket) 60cm: 5kg (inc. antenna, no bracket)

Note: Due to our policy of continuous product improvement Wireless Excellence reserves the right to amend product specifications at any time without notice

T: +44 (0870) 495 9169
F: +44 (0871) 918 7618
E: sales@wirelessexcellence.com
W: www.wirelessexcellence.com

Wireless Excellence Limited
The Oxford Science Park,
G6, Magdalen Centre
Robert Robinson Avenue,
Oxford OX4 4GA