# Metnet product specification

Metnet nodes connect autonomously to form flexible MPtMP
(mesh) self-organising (SON), self-healing links that dynamically
reconfigure to optimise performance and spectral efficiency as LOS
or NLOS circumstances or traffic levels change. The CCS Metnet
system enables microwave deployment in a flexible, organic way
allowing customers to start small and grow as they go.

**Applications include:**

- 🖳 Small cell backhaul (3G, 4G LTE, 5G)

- 📶 Public Wi-Fi backhaul

- 📷 CCTV backhaul

- 🏢 FWA (fixed wireless access)

- 🗄 Fibre extension/protection/redundancy

The Metnet system operates in a single frequency channel with no radio frequency planning required. Frequency reuse in the entire
network is 1. Each node has a wide 270-degree field of view, so only one unit is required per site, rather than multiple radios. There's
no need for any manual alignment and each node supports multiple connections for higher resilience.

The nodes poll the network continually and automatically determine the optimal topology to deliver capacity where needed. Each
cluster runs a Spatial-TDMA transmission schedule, which allows links to operate simultaneously to increase the overall capacity
delivered to each node.

1.2 Gbps throughput is achieved by using a by using a dual channel TDD radio (in a single 112 MHz channel pair) operating at 256 QAM
modulation. The radio features a wideband diplexer which is SW configurable for any channel between 24-29 GHz.

| Metnet 1.2 Gbps | |
|---|---|
| **Technology** | Self-organising (SON) multipoint-to-multipoint system (MPtMP) |
| **Capacity** | 1.2 Gbps single node<br>2.4 Gbps dual node<br>UL and DL ratio 100% dynamically configured |
| **Latency** | 40 μs per hop |
| **Topology** | Flexible MPtMP (Mesh), MultiHop, PtMP or PtP |
| **Scalability** | Interference management enables the system to scale infinitely |

## Radio

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| **Frequency bands** | 26 GHz band (24-26.5 GHz)<br>28 GHz band (27.5-29.5 GHz)<br>Future: 38-43GHz, 60GHz unlicensed |
| **Channel sizes** | 112 MHz ETSI or 100 MHz FCC<br>Single frequency channel used across all nodes |
| **Radio access method** | Dual-TDD |
| **Radio transmit power** | +24 dBm with adaptive power control |
| **Modulation and coding** | Hitless Adaptive Modulation QPSK ½ FEC to 256 QAM 4/5 FEC |

## Services

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| **Ethernet services and QoS** | Native Ethernet<br>802.1Q (VLAN tagging)<br>802.1p (Class of service)<br>Differentiated Services Code Point (DSCP)<br>802.1ad (QinQ) |
| **Synchronisation** | GPS-derived synchronisation providing local master SyncE and 1588v2 PTP clock to the small cell (G.826x/G.827x)<br>1588v2 Transparent Clock (G.8273.2)<br>Recovery from core network SyncE and 1588v2 PTP<br>Proprietary distributed radio synchronisation to overcome GPS failures |

## Antenna

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| **Antenna gain** | Standard node: +19 dBi integrated sectors<br>High gain node: +33 dBi (20 cm) or +43 dBi (60 cm) |
| **Antenna coverage** | Standard node: 270° horizontal x 20° vertical using 16 antenna array<br>Each sector azimuth is 34°<br>High gain node: 4° horizontal x 4° vertical |
| **Range** | Standard node: 2km<br>High gain node: 10km |

## Node characteristics

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| **Size** | Standard node: 185 mm height; 202 mm diameter, 2.3 litres<br>High gain node: 260 mm height; 535 width; 270 mm length |
| **Weight** | Standard node: 4.2 kg<br>High gain node: 6.8 kg |
| **Power requirements** | 100V – 240V AC / 50 – 60 Hz<br>48 V DC and PoE (1 x PD interface IEEE 802.3af/at/bt)<br>35W consumption<br>Power connection via IP67-rated connector |
| **Interfaces** | 2 x GE electrical interfaces via IP67-rated connectors<br>Optional add-on optical interface with SFP |
| **Node MTBF** | 25+ years. System MTBF approaching infinity due to self-healing mesh |

CCS