ONDAS MERCURY PLATFORM

ONDAS NETWORKS

*The **Mercury** Software Definable Radio **(SDR)** is an ultra-compact, low-cost, Endpoint Radio for mission critical data applications including industrial field area devices. The Mercury Endpoint Radio, with its superior receiver sensitivity and support for narrower transmit channels, ensures maximum range from a Jupiter Base Station and support for challenging RF environments.*

Mercury's low power consumption allows for deployment in mission critical IoT (MC-IoT) applications with battery and solar power supplies.

When connected to a Jupiter Base Station, the Mercury radio serves as an Ethernet bridge with QoS support from Jupiter Base Stations. The Mercury Endpoint Radio enables the deployment of low data rate, multi-protocol intelligent devices including support for SCADA RTUs, IEDs, Fault Circuit Indicators, Capacitor Bank controls and backhaul of low range sensor networks based on WiFi, BLE, LoRa, Sigfox, etc. Mercury Endpoint Radios can be deployed at massive scale in a Jupiter network with hundreds(1) of radios operating on a single Base Station.

The Mercury radio operates in a wide range of licensed frequencies (100 MHz to 1 GHz) with configurable channel bandwidths between 1 kHz and 50 kHz. Mercury employs a single band AMC 1x6 sub-channel to communicate with Jupiter Base Stations in standard narrow channel sizes.

The Mercury remote radio is a building block within the Ondas MC-IoT Point to Multipoint (PtMP) multicell, multisector system. It is designed to serve MC-IoT low throughput endpoints along with the Venus Remote Radio serving high throughput endpoints. Both types of remote radios operate in conjunction with the Jupiter MC-IoT sector Base Station Radio.

Key characteristics of the Ondas MC-IoT architecture:

- The bandwidth available in the sector may consist of a contiguous band or an aggregation of multiple adjacent or nonadjacent Private Land Mobile Radio (PLMR) channels. This is referred to as a "sector bandwidth".
- The sector bandwidth is partitioned into multiple sub-channels. When the sector bandwidth consists of multiple adjacent or nonadjacent PLMR channels, the individual PLMR channels will be configured as sub-channels.
- The Jupiter Base Station will operate over the entire channel while Mercury will operate over a single sub-channel. Venus Remote Radio may operate over multiple sub-channels.

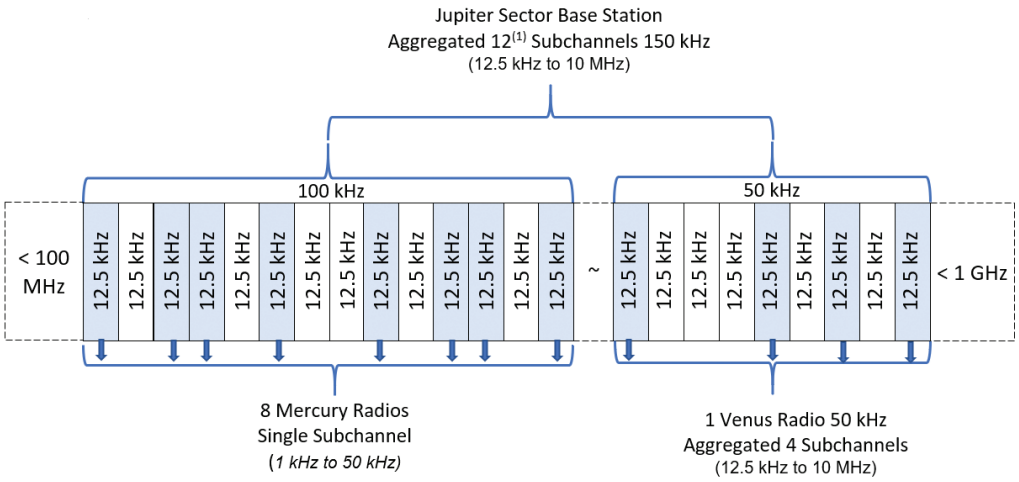

Diagram 1: Ondas MC-IoT Architecture

RADIO SPECIFICATIONS	
Frequency Range	100 MHz to 1 GHz
Channel Sizes	1 kHz to 50 kHz
Throughput	Up to 150 kbps
TX Power	25 dBm
Rx Sensitivity	@ 12.5 kHz: -125 dBm @ 25 kHz: -122 dBm @ 50 kHz: -119 dBm
Waveform	OFDMA
Modulation	QPSK, 16-QAM, 64-QAM
FEC in downlink direction	Convolutional Coding (CC) with rates 1/2, 2/3, & 3/4
FEC in uplink direction	Convolutional Turbo Coding (CTC) with rates 1/2, 2/3, 3/4, 5/6
Duplex Method	TDD
Topology	Point to MultiPoint
Air interface protocol	Band AMC 1x6 as per IEEE 802.16s for Channel bandwidth > 12.5 kHz
Modulation Coding Scheme selection	Dynamically Adjusted
QOS	Best effort, Real time polling service

CONNECTORS / INTERFACES	
DC Input	Phoenix 1778508
Grounding Terminal	10-32 Thread Screw
Serial Data	RJ45 8/8 Jack
Ethernet	RJ45 8/8 Jack
RF 50Ω	SMA Jack Female Socket
GPS	SMA Jack Female Socket

PHYSICAL CHARACTERISTICS	
RF Antenna	50Ω
GPS	Active 5VDC
Power Input	9 to 60 VDC
Data interface	100 Base T, RS232
Power Consumption	< 10 Watts
Indicators	Power On & Error, Link Status
Dimensions	6.6” x 4.8” x 1.6” (168mm x 122mm x 41mm)
Weight	2 lbs. 8 oz (1.14 kg)
Enclosure Protection Rating	IP 50 Standard Optional IP65 Accessory(2)
Operating Temperature	-40 degree C to +75 degree C

SECURITY FEATURES
AES-256 Traffic Encryption
Three-way Handshake Over the Air Rekeying (OTAR)
EAP-TLS Based Authentication with X.509 Certificate and RSA-4096 Public Key Encryption
Hardware Based Secure Boot at the Root of the “Chain of Trust”
NIST Certified Hardware Random Number Generator
Memory Protection and Access Rights Limitation for Security Robustness
Trusted Updates: Authenticated and Validated Upgrades and Configuration Changes
Security Patch Management
Secured SNMPv3 Remote Management
SSHv2 Local Management
Security Events Monitoring, Audit Ready

(1) Jupiter supports 12 Sub-channels currently. Increase up to 500 sub-channels scheduled for Jupiter SW update Q1, 2020.

(2) IP65 Version Available Q4 2019.