

RGW4000  
110W



Homeland Security & Critical Infrastructures

## RADIO GATEWAY

ECOS-D RGW4000 110W is a modular voice and data Gateway with embedded Radio Base Station (RBS) functionalities, designed to meet and exceed the requirements of professional and land mobile radio systems.

Its high quality, combined with state of the art reliability and outstanding modularity makes the ECOS-D RGW4000 110W a digital based equipment, able to support analogue FM, digital DMR conventional Tier II and digital DMR trunking Tier III with all the power given by a SIP interface to make available all voice and data communications over LAN.

The ECOS-D RGW4000 110W can be used in a real time dual mode Analog FM/Digital DMR conventional Tier II or in digital DMR trunking Tier III mode.

All the modes of operation of the ECOS-D RGW4000 110W support natively the flagship simulcast technology by the company without any external ancillary. The ECOS-D RGW4000 110W can be used from stand-alone repeater to conventional simulcast to digital multi-site trunking with a configuration change only.

ECOS-D RGW4000 110W can be connected to build a system natively with IP, E1, 4W+E/M links.

**ECOS-D**  
Digital Extended COmmunications System

**DMR**  
DIGITAL MOBILE RADIO ASSOCIATION

# RGW4000 110W

## MAIN FEATURES

- 3 RU device designed to be hosted in 19-inch rack
- Available in UHF Frequency bands at 12.5kHz/20kHz/25kHz programmable channel spacing
- RBS and Stand alone repeater mode of operation:
  - Conventional Analog FM only
  - Digital DMR Conventional Tier II only
  - Real Time Automatic dual-mode conventional analog FM/ Digital DMR Conventional Tier II with priority mode setting
  - Digital DMR Trunking Tier III (embedded trunking controller)
- Designed to natively support Simulcast technology:
  - Multi-site simulcast support: available for both conventional and trunking operations
  - Simulcast Master, Sub-Master, Slave mode within the same device (virtually no limits in the number of RBS per simulcast channel)
  - Reliable fall-back mode: Slave in-cabinet repeating and Backup Master automatic reconfiguration
  - Synchronization: GPS and/or Precise Time Protocol IEEE 1588v2 with fall-back
  - Voting: analog FM and digital DMR best in class voting
  - Auto Adaptive Technology (A2T): each RBS “adapts” itself to the time and frequency response of the backbone and automatically compensates time-variant differences
  - Multiple-link support: IP (SoIP - Simulcast over IP - technology), E1, 4W+E&M link interfaces
  - Redundant link management between RBSs (E1, 4W+E&M and IP)
- Dispatching and third party API
  - SIP based interface: AISIP (voice) and UDP/IP (data) for DMR Tier II/Tier III and Conventional Analog FM
  - Designed for PSTN link support: PBX SIP Trunk 2.0 interface
  - 4W+E&M for Conventional Analog FM
- Provides high levels of protection from access by unauthorised radio users, via the Unauthorised Access Protection procedure
- Embedded AMBE+2 vocoder for DMR Tier II clear or encrypted (ARC4) voice communications from a local microphone (embedded loudspeaker)
- DMR Data transmission ports (RS232/RS485/LAN), digital I/O and analog inputs available.

## MAINTENANCE

- Display and keypad for easy local maintenance and fault handling

- Modular structure for easy front and back cards replacement. In the event of failure, all modules are individually removable
- Digital I/O, Analog inputs, power supply, antenna connectors and backbone interfaces hosted on dedicated back-cards, easily removable from the back and insulated from voltage overload
- Remote Firmware upgrade over LAN with integrity control (embedded dual-flash memory for storage of two firmware)
- SNMPv2c Network Management System (each RBS is a SNMP agent) and MIB availability for integration with thirdparty NMS system.

## INTEROPERABILITY

- Interoperability (IOP) certificates with DMR major terminals vendors in Tier II and Tier III modes of operations (for further details, please visit the DMR Association website at: [www.dmrassociation.org](http://www.dmrassociation.org)).

## GENERAL SPECIFICATION

|                             |   |
|-----------------------------|---|
| Mechanics                   | Dimensions 3 RU compatible with 19-inch rack mounts                           |
| Weight                      | From 13 Kg (28.6 lbs) <sup>3</sup>  |
| Supported Modulations       | FM/PM for analogue mode<br>4FSK/C4FM for digital mode with I&Q mo/demodulator |
| Frequency Generation        | Synthesized   |
| Channel Spacing             | 12.5 kHz / 20 kHz / 25 kHz <sup>1</sup>                                       |
| Mode of Operation           | Simplex / Half-Duplex / Duplex  |
| Digital Data gross bit Rate | 9600 bps with 4FSK/C4FM digital modulation in 12.5 kHz channel                |
| Temperature Range           | -30° - +60°C (-22°F - +140°F)   |
| Power Supply                | 48 Vdc (galvanically insulated)   |
| Input Current (at 48 Vdc)   | Transmission <sup>2</sup> Standby <sup>2</sup>                                |



|                           |  |           |
|---------------------------|--|-----------|
|                           | UHF: 7A  | UHF: 0.9A |
|                           | 800: 7A  | 800: 0.9A |
|                           | 900: 7A  | 900: 0.9A |
| CTCSS (TX/RX split-tones) | Yes. 67 – 254.1Hz (with 0.1Hz step)  |           |
| DCSS (TX/RX split-tones)  | Yes  |           |
| Backbone Interface        | From 4xE1 G.703/G704 (cross connect and drop-insert functionality)<br>From 4x4W+E/M<br>1xLAN port 10/100 Base T (SoIP Link, remote)<br>Firmware upgrade and SNMP NMS |           |
| I/O ports                 | LAN, RS232, 4 digital inputs, 4 digital outputs, 2 analog inputs   |           |

#### SYNCHRONIZATION

|                           |  |  |
|---------------------------|--|--|
| RBS Main Clock            | OCXO (Oven Controlled Crystal Oscillator)<br>50 ppb temperature stability with programmable zero-offset compensation   |  |
| Simulcast Synchronization | From Built-in GPS (1+1 option available on request)<br>From incoming IP GMC/BC/OC PTP IEEE 1588V2<br>From incoming E1 stream (2.048 MHz)<br>From 4W Out of Band tone (3400 Hz) |  |

#### TIER II CONVENTIONAL / ANALOG FM CONVENTIONAL

|                         |   |  |
|-------------------------|---|--|
| Configuration Mode      | Stand-Alone Repeater  |  |
| Simulcast Configuration | Radio Base Station: Macro-cell Master/<br>wide coverage Virtual<br>repeater |  |
|                         | Sub-Master/ Slave   |  |

#### TIER III TRUNKING

|                         |  |  |
|-------------------------|--|--|
| Configuration Mode      | Radio Base Station with Embedded Trunking<br>Controller: Control Channel RBS/Traffic Channel RBS   |  |
| Simulcast Configuration | Radio Base Station Macro-cell Master with<br>wide coverage Virtual<br>Embedded Trunking Controller /Macro-cell repeater<br>Master for Traffic Channel/Sub-Master/Slave |  |

## TRANSMITTER

|   |   |         |         |
|---|---|---------|---------|
| Frequency in MHz                          | UHF   | 800     | 900     |
|   | 450-526                                       | 806-894 | 896-941 |
| Output Impedance                          | 50 Ohms                                       |         |         |
| Output Power                              | Programmable from 10W up to 110W (0.1dB step) |         |         |
| Maximum Deviation (RSD)<br>12.5/20/25 kHz | ± 2.5/± 4 /± 5 kHz                            |         |         |
| Adjacent Channel Power                    | <-60 dB@12.5 kHz / -70 dB@25 kHz              |         |         |
| Intermodulation Attenuation               | >40dB   |         |         |
| Spurious and Harmonic                     | UHF: <-36dBm < 1GHz <-30dBm > 1GHz            |         |         |

|                     |  |  |  |
|---------------------|--|--|--|
| Emissions           | 800/900: <-36dBm < 1GHz <-26dBm > 1GHz |  |  |
| Audio Response      | +1, -3dB; 300-3000 Hz                  |  |  |
| Audio Distortion    | < 3% @ 1000Hz; 60% RSD                 |  |  |
| S/N                 | >45dB (12.5 kHz)<br>>50dB (25 kHz)     |  |  |
| Frequency Stability | ± 0.05 ppm                             |  |  |

## RECEIVER

|  |  |         |         |
|--|--|---------|---------|
| Frequency in MHz                               | UHF  | 800     | 900     |
|  | 450-526  | 806-894 | 896-941 |
| RF Input Impedance                             | 50 Ohms  |         |         |
| Analog Sensitivity                             | PM modulation: < -119 dBm @ 12 dB SINAD psofo  |         |         |
| Digital sensitivity                            | C4FM: < -120 dBm @ BER = 5x10 <sup>-2</sup><br>4FSK: < -120 dBm @ BER = 5x10 <sup>-2</sup> |         |         |
| Adjacent Channel<br>Selectivity 12.5/20/25 kHz | >60 dB/ 70 dB/ 70 dB (ETSI)  |         |         |
| Intermodulation Rejection<br>12.5/20/25 kHz    | >70 dB (ETSI)  |         |         |
| Spurious and Image<br>Response Rejection       | >70 dB (ETSI)  |         |         |
| Audio Response                                 | +1, -3dB; 300-3000 Hz  |         |         |
| Audio Distortion                               | <3% @ 1000Hz; 60% RSD  |         |         |
| S/N  | >45dB (12.5 kHz)<br>>50dB (25 kHz)   |         |         |
| Line Output                                    | -10dBm   |         |         |

## EMISSION DESIGNATORS

|              |   |
|--------------|---|
| Analog FM/PM | 8K50F3E/8K50G3E, 11K0F3E/11K0G3E;<br>14K0F3E/14K0G3E, 16K0F3E/16K0G3E |
| Digital 4FSK | 7K60FXD/7K60FXE   |
| Digital C4FM | 8K10F1D/8K10F1E   |

## COMPLIANCIES

|        |  |
|--------|--|
| FCC    | CFR Title 47 - Part 90 - Part 15B        |
| CE     | R&TTE Directive 1999/5/EC                |
| Safety | EN 60950-1, EN 50385, EN 62311           |
| EMC    | EN 301 489-1, EN 301 489-3, EN 301-489-5 |

Not all variants and features might be available in all countries or in all geographic areas.

| RGW4000 (IP links ordering guide*) |       |                                  | RGW4000J-A-1-AOCI-4W0-EI00-S2-V2-L |    |                     |
|------------------------------------|-------|----------------------------------|------------------------------------|----|---------------------|
| A                                  | 00000 | No Radio (gateway features only) | B                                  | 0  | No receiver         |
|                                    | U2110 | 110W UHF (450 - 526 MHz)         |                                    | W  | Single receiver     |
|                                    | U4110 | 110W 800 (806-894 MHz)           |                                    | D  | Receiver Diversity  |
|                                    | U5110 | 110W 900 (896-941 MHz)           | L                                  | G0 | No GPS receiver     |
|                                    | U2000 | Receive Only UHF (450 - 526 MHz) |                                    | G1 | Single GPS receiver |
|                                    | U4000 | Receive Only 800 (806-894 MHz)   |                                    | G2 | Dual GPS Receiver   |
|                                    | U5000 | Receive Only 900 (896-941 MHz)   |                                    |    |                     |

Specifications subject to change without notice

<sup>1</sup> According with the national regulations where RGW is used <sup>2</sup> Value is to be intended for a fully equipped RGW configuration <sup>3</sup> Depending on RGW equipment

# RGW4000 110W

