ECOS-D RBS4000 25W is a modular voice and data Radio Base Stations (RBS) 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 RBS4000 25W a digital based equipment, able to support analogue FM, digital DMR conventional Tier II and digital DMR trunking Tier III.

RBS4000 can be used in both real-time dual mode Analog FM/Digital DMR conventional Tier II and in digital DMR trunking Tier III mode; the change of operating mode from Tier II to Tier III does not need any FW change, but it is just a matter of configuration. In addition, with ECOS-D base stations, Tier II terminals can communicate with Tier III terminals in interconnected networks.

All the modes of operation of the ECOS-D RBS4000 25W support natively the flagship simulcast technology by the company without any external ancillary. The ECOS-D RBS4000 25W can support configuration ranging from stand-alone repeater to conventional simulcast or multi-site trunking with a configuration change only. ECOS-D RBS4000 25W can be connected to build a system natively with IP, 4W+E/M links.

**MAIN FEATURES**

› 3 RU device designed to be hosted in 19-inch rack
› Available in Low-VHF, VHF, UHF, High-UHF frequency bands at 12.5kHz/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 compensate time variant differences
  - Multiple-link support: IP (SoIP—Simulcast over IP–technology), 4W+E&M link interfaces

› Redundant link management between RBSs (4W+E&M and IP)
› 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 firmwares).
› SNMPv2c Network Management System (each RBS is a SNMP agent) and MIB availability for integration with third party NMS system.

**INTEROPERABILITY**

Interoperability (IOP) certificates with DMR major terminals vendors in Tier II and Tier III modes of operation.

For further details, please visit the DMR Association website at: www.dmrassociation.org.
### TECHNICAL DATA

#### GENERAL
- **Dimensions**: 3 RU compatible with 19” rack mounts
- **Weight**: From 13 kg (28.6 lbs)
- **Supported modulations**: FM/PM for analogue mode, 4FSK/C4FM for digital mode with I&Q modulator
- **Frequency generation**: Synthesized
- **Channel spacing**: 12.5 and 25 KHz
- **Channel step**: 5 kHz - 6.25 KHz
- **Mode of operation**: Simplex / Half-Duplex / Duplex
- **Modulation type**: Dual mode:
  - Analog:
    - FM/PM (EN 300 086; 12.5, 25 kHz).
    - Emission designators (voice & data); 8K50F3E/8K50G3E, 11K0F3E/11K0G3E, 16K0F3E/16K0G3E
  - Digital:
    - 4FSK 9600 bit/s (EN 300 113)
    - C4FM 9600 bit/s (APCO25; 12.5 kHz)
- **Emission mode**: Full-Duplex (with external filters)
- **Digital data gross bit rate**: 9600 bps with 4FSK/C4FM digital modulation in 12.5 kHz channel
- **Temperature range**: From -30° to +60°C [-22°F to +140°F]
- **CTCSS**: 67-254.1 Hz (step 0.1 Hz)
- **DCSS**: Yes
- **Backbone interface**: 4x4W+E/M, 1xLAN port 10/100 Base T (SoIP Link, remote firmware upgrade and SNMP NMS)
- **I/O ports**: LAN, RS-232, 4 digital inputs, 4 digital outputs, 2 analog inputs
- **Antenna connectors**: 50 Ohm

#### SYNCHRONIZATION
- **RBS main clock**: OCXO (Oven Controlled Crystal Oscillator), 50 ppb temperature stability with programmable zero-offset compensation
- **Simulcast synchronization**: From built-in GPS (1+1 option available on request)
  - From incoming IP GMC/BC/OC PTP IEEE 1588v2
  - From 4W Out of Band tone (3400 Hz)

#### TIER II CONVENTIONAL / ANALOG FM CONVENTIONAL
- **Configuration mode**: Stand-alone repeater
- **Simulcast configuration**: Wide coverage Virtual repeater
  - Radio Base Station: macro-cell Master/sub-Master/slave

#### TIER III TRUNKING
- **Configuration mode**: Radio Base Station with embedded Trunking Controller: control channel RBS/Traffic channel RBS
  - Simulcast configuration: Wide coverage Virtual repeater
  - Radio Base Station macro-cell Master with embedded Trunking Controller macro-cell Master for Traffic Channel/sub-master/slave

#### TRANSMITTER
- **Frequency bands**: 66-88 MHz or 136-174 MHz or 400-470 MHz or 854-921 MHz
- **Output impedance**: 50 Ohms
- **RF power**: From 2 to 25 Watt

### RECEIVER
- **Frequency bands**: 66-88 MHz or 136-174 MHz or 400-470 MHz or 854-921 MHz
- **RF input impedance**: 50 Ohms
- **Receiver sensitivity**: Analog FM (12.5 kHz): < -109,5 dBm @ 20 dB SINAD psfo; Digital 4FSK (12.5 kHz): < -115 dBm @ BER = 1x10^-2
- **Adjacent channel selectivity**: 12.5/25 kHz
  - > 60 dB/70 dB (ETSI)
- **Intermodulation rejection**: 12.5/25 kHz
  - > 70 dB (ETSI)
- **Spurious and image response rejection**: > 70 dB (ETSI)
- **Audio response**: +1, -3dB; 300-3000 Hz
- **Audio distortion**: < 3% @ 1000Hz; 60% RSD
- **S/N**: >45dB (12.5 kHz) / >50dB (25 kHz)
- **Line output**: -10 dBm

### POWER SUPPLY
- **Input voltage**: 13.2 Vdc (10.8-15.6 Vdc - negative grounded)
- **Current drain**: Stand-by: 3 A max @13.2 Vdc
  - Transmit: 8.5 A max @13.2 Vdc
- **Current drain**: Stand-by: 1 A max @48 Vdc
  - Transmit: 2.5 A max @48 Vdc

### AUXILIARY POWER SUPPLY
- **Output voltage**: 13.2 Vdc (10-14.8 Vdc with ambient temperature range = -30° to +60°C with load = 2A max)
- **Output current**: 2A max

### RF SPLITTER
- **Output level attenuation**: 0-3 dB (with ambient temperature range = -30° to +60°C)

### GPS
- **GPS receiver model**: LEA-6T-0-001

### ENVIRONMENTAL CONDITIONS
- **Operating temperature**: -30°C to +60°C [-22° to +140 °F]
  - This is the temperature measured in close proximity to the device. If the device is mounted in a cabinet, the temperature within the cabinet is measured
- **Equipment ventilation**: A minimum of ½ RU (4.4 cm – 1.7 inches) must be left among devices installed in the same cabinet
  - Depending on RBS equipment

### COMPLIANCES
- **CE**: RED Directive 2014/53/EU
- **FCC**: CFR Title 47 - Part 90, Part 15B, Part 22

Not all variants and features might be available in all countries or in all geographic areas.
CONFORMITY
The of ECOS-D A2T family products are FM/4FSK/C4FM two way repeater suitable for use in private mobile radio (PMR) systems. It utilises operating frequencies not harmonised in intended country of use.
A license must be obtained before using the product in intended country of use. Ensure specific country licensing requirements are fulfilled. Limitations of use can apply in respect of operating frequency, transmitter power and/or channel spacing.
The equipment is CE marked according to the requirements specified in the “Radio Equipment” 2014/53/EU Directive.
The ECOS-D A2T radio equipment is Class 2 and can be used in any European Union countries subject to authorization by the competent authority for the type of service in each country.

This device can be used in any country not belonging to the European Union that has approved its use.

The ECOS-D A2T family products complies with relevant Standards listed here.

› Safety - Art. 3.1a
- EN 62368-1
- EN 62232
- EN 50385

› EMC - Art. 3.1b
- EN 301 489-1
- EN 301 489-5
- EN 301 489-19

› Radio - Art. 3.2
- EN 300 086
- EN 300 113
- EN 303 413

› DMR
- TS 102 361-1
- TS 102 361-2
- TS 102 361-3
- TS 102 361-4

ROHS COMPLIANCY
The equipment is compliant to the RoHS 2011/65/CE Directive and following revisions.

ENCODING CRITERIA
The following legend defines the coding rules for the products derived from the archetypes. It is specific for an ECOS-D A2T equipment fitted with the 25W PA.
The model name for each product derived from the archetype, is obtained by assigning to the variables (lowercase letters) one of the values listed here.

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