



## RADIO BASE STATION

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.

The ECOS-D RBS4000 25W 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 RBS4000 25W support natively the flagship simulcast technology by the company without any external ancillary. The ECOS-D RBS4000 25W can be used from stand-alone repeater to conventional simulcast to digital multi-site trunking with a configuration change only.

ECOS-D RBS4000 25W can be connected to build a system natively with IP, E1, 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/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)

# RBS4000 25W

- 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), E1, 4W+E&M link interfaces
- Redundant link management between RBSs (E1, 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 firmware)
- 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 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 13Kg (28.6lbs) <sup>3</sup>	
Supported Modulations	FM/PM for analogue mode	
	4FSK/C4FM for digital mode with I&Q	
	mo/ demodulator	
Frequency Generation	Synthesized	
Channel Spacing	12.5 kHz / 20 kHz / 25 kHz <sup>2</sup>	
Mode of Operation	Simplex / Half-Duplex / Duplex	
Digital Data gross bit Rate	9600bps with 4FSK/C4FM digital modulation in 12.5kHz channel	
Temperature Range	-30° - +60°C (-22°F - + 140°F)	
Power Supply	12Vdc; 48 Vdc (galvanically insulated)	
	85-264 Vac (47-63 Hz) EU or US plug	
Input Current (at 48 Vdc)	Transmission <sup>2</sup>	Standby <sup>2</sup>
	VHF-L: 2.5A	VHF-L: 0.6A
	VHF: 2.5A	VHF: 0.6A
	UHF: 2.5A	UHF: 0.6A
	UHF-H: 2.5A	UHF-H: 0.6A
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)	
	From 4x4W+E/M	
	1xLAN port 10/100 Base T (SoIP Link, remote 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) 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 incoming E1 stream (2.048 MHz) 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 in MHz	VHF-L	VHF	UHF	UHF-H
	66-88	136-174	400-470	854-921
Output Impedance	50 Ohms			
Output Power	Programmable from 2W up to 25W (0.1 dB step)			
Maximum Deviation (RSD) 12.5/20/25 kHz	± 2.5/± 4 /± 5 kHz			
Adjacent Channel Power	<-60 dB@12.5 kHz / -70 dB@25 kHz (ETSI)			
Intermodulation Attenuation	>40dB (ETSI)			
Spurious and Harmonic	<-36 dBm < 1 GHz			
Emissions	<-30 dBm > 1 GHz (ETSI)			
Audio Response	+1, -3dB; 300-3000 Hz			
Audio Distortion	< 3% @ 1000Hz; 60% RSD			
S/N	>45dB (12.5 kHz) >50dB (25 kHz)			
Frequency Stability	± 0.05 ppm			

## RECEIVER

Frequency in MHz	VHF-L	VHF	UHF	UHF-H
	66-88	136-174	400-470	854-921
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> 4FSK: < -120 dBm @ BER = 5x10 <sup>-2</sup>			
Adjacent Channel Selectivity 12.5/20/25 kHz	>60 dB/ 70 dB/ 70 dB (ETSI)			
Intermodulation Rejection 12.5/20/25 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	-10dBm			

## EMISSION DESIGNATORS

Analog	FM/PM 8K50F3E/8K50G3E, 11K0F3E/11K0G3E; 14K0F3E/14K0G3E, 16K0F3E/16K0G3E
Digital 4FSK	7K60FXD/7K60FXE
Digital C4FM	8K10FID/8K10FIE

## 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.

RBS4000C with IP link IP options*			RBS4000C-A-B-C-4W0-E100-S1-F-L		
A	V1025	25W VHF-L (66 - 88 MHz)	B	W	Single receiver
	V3025	25W VHF (136 - 174 MHz)		D	Receiver Diversity
	U1025	25W UHF (400 - 470 MHz)	C	A100	12 Vdc powered (negative grounded) + 12 Vdc power cord
	U3025	25W UHF (854 - 921MHz)		AOC1	48 Vdc powered (galvanically insulated) + 48 Vdc power cord
	V1000	Receive Only VHF-L (66 - 88 MHz)		AOE1	110 - 220 Vac powered
	V3000	Receive Only VHF (136 - 174 MHz)	F	VO	no vocoder
	U1000	Receive Only UHF (400 - 470 MHz)		V1	AMBE+2 3000 vocoder board
	U3000	Receive Only UHF (854 - 921MHz)		L	G0
		G1	Single GPS receiver		
		G2	Dual GPS Receiver		

\*4W + E/M and E1 links available on request.

Specifications subject to change without notice

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

# RBS4000 25W

