Selex ES
A Finmeccanica Company

Homeland Security & Critical Infrastructures

RBS4000 25W
RADIO BASE STATION

ECOS-D RBS4000 25W is a Selex ES 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 Selex ES 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.

ECOS·D
Digital Extended COmmunications System

DMR
DIGITAL MOBILE RADIO ASSOCIATION

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)
  - 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.

DMR
DIGITAL MOBILE RADIO ASSOCIATION

GENERAL SPECIFICATION

Mechanics	Dimensions 3 RU compatible with 19-inch rack mounts	
Weight	from 13 Kg (28.6 lbs)[3]	
Supported Modulations	FM/PM for analogue mode 4FSK for digital mode with I&Q mo/demodulator C4FM	
Frequency Generation	Synthesized	
Channel Spacing	12.5 kHz / 20 kHz / 25 kHz[1]	
Mode of Operation	Simplex / Half-Duplex / Duplex	
Digital Data gross bit Rate	9600 bps with 4FSK digital modulation in 12.5 KHz 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[2]	Standby[2]
	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	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 External Reference Source 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/

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 and alternate Channel Power	65 dB (ETSI)			
Intermodulation Attenuation	40dB			
Spurious and Harmonic Emissions Attenuation	36 dB (< 1GHz) 30 dB (> 1GHz) (ETSI)			
Audio Response	+1, -3dB; 300-3000 Hz			
Audio Distortion	Less than 2% at 1000Hz; 60% RSD			
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: < -118 dBm @ 12 dB SINAD psofo			
Digital sensitivity	C4FM: ≤ -118 dBm @ BER = $5x10^{-2}$ 4FSK: ≤ -118 dBm @ BER = $5x10^{-2}$			
Adjacent Channel Selectivity 12,5/20/25 kHz	60 dB/ 70 dB/ 70 dB (ETSI)			
Intermodulation Rejection 12.5 and 25 kHz	70 dB (ETSI)			
Spurious and Image Response Rejection	70 dB (ETSI)			
Audio Response	+1, -3dB; 300-3000 Hz			
Audio Distortion	Less than 2% at 1000Hz; 60% RSD			
S/N	45dB (12.5 kHz) 50dB (25 kHz)			
Line Output	-10dBm			

EMISSION DESIGNATORS

Analog FM/PM	8K50F3E/8K50G3E, K0F3E/11K0G3E; 16K0F3E/16K0G3E
Digital 4FSK	7K60FXD/7K60FXE
Digital C4FM	8K10F1D/8K10F1E

COMPLIANCIES

FCC	CFR Title 47 - Part 90
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

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)		A1C1	48 Vdc powered (galvanically insulated) + 48 Vdc power cord
	V1000	Receive Only VHF-L (66 - 88 MHz)		A1E1	110 – 220 Vac powered
	V3000	Receive Only VHF (136 - 174 MHz)	F	V0	no vocoder
	U1000	Receive Only UHF (400 - 470 MHz)		V1	AMBE+2 3000 vocoder board
	U3000	Receive Only UHF (854 - 921MHz)	L	G0	no GPS receiver
				G1	Single GPS receiver
				G2	Dual GPS Receiver

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

Specifications subject to change without notice

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

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