



**RaCE Family
Railway Communication Equipment**



GSM-R CAB Radios



SELEX
Communications

A Finmeccanica Company

GSM-R CAB Radios - Overview

Railway operators need to extend the use of GSM-R in voice and data ground-to-train radio communications obtaining the highest level of performance. The many different GSM-R applications are met by these highly cost effective solutions. SELEX Communications have developed a number of different solutions to meet the requirements for onboard communication equipment. All of these solutions provide EIRENE/MORANE standard features for vehicular radio modules and comply with all environmental safety requirements.

SELEX Communications is a leader in the development of wireless solutions for railway operators. The Company's long experience in digital mobile communications and railway technology has been the basis for advanced development of GSM-R terminals and mobile radio equipment for all customers' needs.

A member of international standards organisations as ETSI and the GSM-R Industry Group, SELEX Communications provides optimised, convenient and reliable solutions for secure communications along tracks.

Starting from a full equipped Railway Communication Equipment, SELEX Communications provides different solutions to meet

the requirements for onboard communication equipment. It is possible to select the most appropriate configuration that fits exactly the customer requirements, without extra cost.

These solutions provide voice capability, a dedicated key for special functions and a comprehensive user friendly menu. SELEX Communications' GSM-R CAB Radio Systems provides the features of an advanced GSM-R telephone, with all the special railway functions: Advanced Speech Call Items (ASCI) phase 2+, Emergency Call, eMLPP priority features and Functional Numbering.

The SELEX Communications' Railway Communication Equipment also offers data transmission and shunting operations; it is possible to use a Local Maintenance Tool (LMT) to configure Software Download and diagnostics operations.

The highly flexible Railway Communication Equipment design allows for a wide range of customized applications, to meet many different railway operators' needs.

Software updating through a data port enables easy evolution and integration of future EIRENE/MORANE requirements. SELEX Communications CAB is the smartest answer to the railway needs of reliable and cost effective ground-to-train communication.



RaCE2500 - RAILWAY COMMUNICATION EQUIPMENT

The **RaCE2500 Railway Communication Equipment** is the in house designed SELEX Communication GSM-R Product Line.

RaCE2500 is an innovative solution to support all GSM-R communications features that provides voice and data transmission for on board applications at the right price.

The RaCE2500 comprises a 3U 19" Standard Rack (Radio and Control Parts) and a graphical MMI. For certain equipment, up to 2 MMIs can be allocated per CAB unit.

The rack includes up to two GSMR Class 2 (ETSI EN 300 910) Radio modules, one for CS voice/data applications, the other

(optional radio) for PS data transmission, a Power Supply Module, a Control Card Module, an optional MVB gateway and UIC interface. It would be possible to use radio slots for technologies other than GSM-R, by the use of radio commands via the CAB Radio backplane serial link (i.e. AT commands). In this case different Control Card Module SW would be necessary.

RaCE2500 provides the features of an advanced GSM-R telephone, with all the special railway functions: Advanced Speech Call Items (ASCI) phase 2+, Emergency Call, eMLPP priority features and Functional Numbering.

The RaCE2500 provides for communications on the train bus

(MVB) and it is ready to interface with the driver safety device, the train board recorder system.

The RaCE2500 also offers data transmission and shunting operations; it is possible to use a Local Maintenance Tool (LMT) to configure Software Download and diagnostics operations.

The highly flexible RaCE2500 design allows for a wide range of customized applications, to meet many different railway operators' needs.

RaCE2360 CAB RADIO SYSTEM

For on-board applications requiring a high level of reliability, SELEX Communications proposes the **Railway Communication Equipment RaCE2360**.

The RaCE2360 is an innovative GSM-R CAB Radio System to support all GSM-R communications features at the right price; it provides voice and data transmission for on board applications.

The RaCE2360 comprises:

- 3U 19" standard rack (Radio and Control Parts).
- Graphical MMI (alternatively 2 MMIs running simultaneously).
- Optional 1U 19" standard rack (MVB gateway and ASU).
- Optional 3U 19" standard rack filters.
- Fitting kit and antenna.

The MMI selection is provided: via a dedicated MMI key (Driver Direction Switch - DDS), or via an ON/OFF button (it is possible to configure the MMI switch-on).

In installations with one MMI it is possible to switch it on it simultaneously with the power supply activation.

The rack includes up to two GSMR Class 2 (ETSI EN 300 910) Radio modules, one for CS voice/data applications, the other (optional radio) for PS data transmission, a Power Supply Module, a Control Card Module and a UIC interface to external audio devices.

The RaCE2360 provides for communications on the train bus (MVB) including the MVB gateway and ASU. This feature extends the communication capability to the driver safety device, the train board recorder system.



Some elements of RaCE2360 solution

RaCE2300 COMPACT CAB RADIO

For on-board applications where there is not enough space to house a graphical MMI, SELEX Communications provides the RaCE2300 Railway Communication Equipment, a compact version of GSM-R CAB Radio.

RaCE2300 is an innovative solution to support all GSM-R communications features at the right price; it provides voice and data transmission for on board applications in a single module with reduced weight and size. The RaCE2300 comprises two interfaces to the conductor staff. These are switched by the bench key on the tail bench in the locomotive. The (3U, 19") fitting provides for locomotive installation. As with all SELEX CAB radios for voice and data, RaCE2300 provides communications on the train bus (MVB) and it is ready to interface with the driver safety device, the train board recorder system. RaCE2300 also offers data transmission and shunting operations.

The highly flexible RaCE2300 design allows for a wide range of customized applications, to meet many different railway operators needs.

RaCE2300 provides EIRENE/MORANE standard features for vehicular radio modules and complies with all environmental safety requirements. It provides 8 W transmission power, voice capability (ASCI), a dedicated key for direct emergency calls, and a comprehensive user friendly menu on the handset MMI. RaCE2300 is also easy to install.



RaCE2300 is managed by two active handsets which provide RaCE2300 is managed by two active handsets, which provide the features of an advanced GSM-R telephone, with all special railway functions: Advanced Speech Call Items (ASCI) phase 2+, Emergency Call, eMLPP priority features and Functional Numbering.

The RaCE2300 comprises a rack made up of an 8W Radio Mobile Module RMM2300, a Power Supply Module, Capacitor Unit, Remote Switch Unit, Optional RMM2300 (supporting GPRS without ASCI features), Gateway MVB and ICU Module for the isolation of the serial interfaces present on the radio modules (RS422).

The two Active Control Handsets include a keyboard and display for the management of the Radio Mobile Module and Red key for Emergency Calls, a dedicated PTT (Push To Talk) button for voice group calls and Loudspeaker.

RaCE2300 offers a user friendly MMI to manage the GSM-R functions. This product is especially suitable for applications, where high RF power output is required.

GSC2300: ETCS DATA ONLY RADIO

For use as the radio subsystem of ETCS, SELEX Communications also provides the GSC2300. It is designed for vital data signalling transmission applications and provides redundancy by the use of two identical sections. Each section uses an RMM2300 module, power supply, capacitor and alarm unit and duplexer and they use independent power supplies.

The GSC2300 provides all EIRENE/MORANE standard features for vehicular radio modules and complies with all environmental safety requirements and with the 96/48 interoperability directive. Software updating through a data port enables easy evolution and integration of future EIRENE/MORANE requirements.



TECHNICAL DATA

	RaCE2300	RaCE2360	RaCE2500	GSC2300
Supported Services:	GSM Phase 2/2+ CS Bearer Services for data transmission GSM Phase 2/2+ Teleservices GSM Phase 2/2+ ASCI Specifics EIRENE/MORANE GSM Phase 2/2+ Supplementary Services			
Call Related Functions:	Call authorised users (including controllers) Railway Emergency Calls Receive incoming calls Group and broadcast calls Terminate calls			
Additional Functions:	Select Mobile Radio Network Register and de-register functional number			
		Radio Functions (Switch radio on/off)		\
		Adjust Loudspeaker Volume		\
		Remote Unit MMI		\
		Red key for dir. Railway Emergency Call		\
		Tone to warn of incoming Calls /Messages		\
GPRS:	GPRS Class 8 (1UL + 4DL)			\
Mechanical aspects:	Standard Euroradio V.28 serial interface for data connection			\
	Index of protection: IP20			\
	Full graphic 132 x 65 black & white display	Full graphic 360 x 28 black & white display	Advanced graphic 7" wide 800x400 Colour display	\
Power Class:	Class 2 (8 W) GSM-R			
Environmental conditions:				
- Working Temperature:	-20 to +55 °C			
- Extreme T (with de-rating):	-25 to +70 °C			
- Storage:	-40 to +85 °C			
- Altitude:	-100 to 1800 m (RSL)			
- Humidity:	EN50155 and 100% for short periods			
Power supply:	24 VdC			
Power Consumption:	Max 60W			
Sensitivity:	-104 dBm			
Frequency band:	Uplink (MHz) UIC 876-880 / E-GSM 880-915 Downlink (MHz) UIC 921-925 / E-GSM 925-960			
Weight:	6 kg			13 kg
Dimensions (HxWxD)	132.5 x 482.6 x 194 mm			