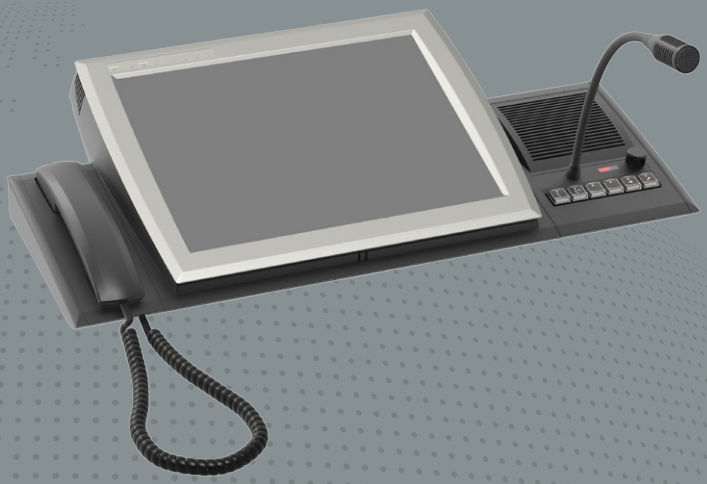

FIXED TERMINAL SYSTEM

Guidelines

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List of Abbreviations

3GPP	3rd Generation Partnership Project
BSC	Base Station Controller
CB	Central Battery
CBC	Cell Broadcast Centre
CC	Country Code
CFU	Call Forward Unconditional
CT	Call Type
DSD	Driver Safety Device
DTMF	Dual-Tone Multi-Frequency
DVD	Digital Versatile Disc
ECT	Explicit Call Transfer
EIRENE	European Integrated Railway Radio Enhanced Network
ETSI	European Telecommunications Standards Institute
FRS	Functional Requirements Specification
FTS	Fixed Terminal Sub-System
GSM	Global System for Mobile Communication
GSM-R	Global System for Mobile Communication – Railway
IC	International Code
IR	Implementation Report
IN	Intelligent Network
ISDN	Integrated Services Digital Network
LAC	Location Area Code
LB	Local Battery
LCD	Liquid Crystal Display
MLPP	Multilevel Precedence and Pre-emption
MMI	Man Machine Interface
MSC	Mobile Switching Centre
MSISDN	Mobile Services ISDN
MTBF	Mean Time Between Failures
NDC	National Destination Code
NMS	Network Management System
NSS	Network and Switching Sub-system
NTP	Network Time Protocol
OTDI	Originator To Dispatcher Information
PBX	Private Branch Exchange
PRI	Primary Rate Interface
PTT	Push To Talk
QSIG	Q-Interface Signalling Protocol
REC	Railway Emergency Call
RFQ	Request for Quotation
RTP	Real Time Protocol
SCP	Service Control Point
SIP	Session Initiated Protocol
SMS	Short Message Service
SMSC	Short Message Switching Centre
SMPP	Short Message Peer-to-Peer Protocol
SNMP	Simple Network Management Protocol

SRS	System Requirements Specification
UCS	Universal Character Set
UIC	International Union of Railways
UUS	User-to-User Signalling
VBS	Voice Broadcast Service
VGCS	Voice Group Call Service
VoIP	Voice Over IP

1 Introduction

Controllers in the traffic management centers are equipped with a fixed telecommunication system – so called Fixed Terminal System (FTS), which basically combines the all operational railway communications in one device – controller terminal. This terminal is an interface for controller communication with outside world - even with the train driver.
It should be noted that the FTS and especially controller terminal, as an integral part of the fixed network, is the most important contact for the user, with a GSM-R network. As such, must be user friendly and support all the features that a controller in their communications needs.
In case of roaming and border-crossing calls, where fixed GSM-R communication are used (e.g. controller - controller communication on borderlines, or train driver – controller communication independent of their country of origin), the minimum of GSM-R communication services, has to be provided.

The present document only addresses the minimum performance of the FTS network, for other technical requirements please refer to the actual EIRENE FRS and SRS versions.

2 Functional requirements

This section details the functional requirements for the Fixed Terminal System (FTS) equipment in the GSM-R network, including:

a) general requirements

b) role management

c) handling of call priorities

d) call management

e) call handling

f) controller terminal

g) short messages – SMS

h) Train Location System (TLS) for controllers

i) phonebook

j) network management system

k) activity log

Connections of FTS with other systems or networks from functional point of view should be the following:

a) connection with GSM-R core network equipment

b) connection with private railway telecommunication networks;

c) connection with public operator networks;

d) connection with specialized railway systems and telecommunication systems (e.g. train control systems, analogue radio, public address systems etc.)

The FTS should provide the appropriate interfaces to allow connection to legacy telecommunication systems.

2.1 General requirements

2.1.1 For post incident analysis, the FTS should provide the possibility to record all operational speech and data calls.

2.1.2 The following data application shall be supported for the FTS:

a) text message services

b) general data applications

2.1.3 The following EIRENE features shall be supported for the FTS:

a) functional addressing

b) high priority calls

c) railway emergency calls

d) shunting link assurance signal

2.1.4 The FTS shall/should support the following call related services:

a) display of identity of called/calling user

b) priority and pre-emption

c) call forwarding

d) call hold

e) call waiting

f) call transfer

g) multi-party call

2.1.5 The controller terminal shall provide a controller with confirmation that the system is progressing a request to initiate and/or terminate a call.

2.1.6 It shall be possible to mute and unmute any audio device microphone associated with the FTS during an ongoing call to prevent miscommunication.

2.1.7 If the audio device microphone associated with the FTS is muted, then a visual reminder shall be displayed to the controller.

2.1.8 If the system is not able to connect the call, an audible and visual indication shall be provided to the controller.

2.1.9 The functional identity (which may contain an alphanumeric description) of the calling party, when available, shall be displayed.

2.2 Role Management

2.1.10 The FTS should provide the facility to transfer its role to a different controller terminal, depending on the current traffic situations and/or human resources, e.g. nightshift or emergency situations.

2.1.11 For this purpose FTS should provide different user profiles which should be used for different controllers.

2.1.12 Several user profiles should be configurable centrally.

2.1.13 Rights for each profile should be configurable.

2.1.14 After login the controller should get the parameters and default role automatically.

2.1.15 The controller should be able to select more than one role simultaneously.

2.1.16 It should be possible to select a role from several terminals concurrently.

2.1.17 Incoming calls shall be routed to all terminals associated with a selected role.

2.1.18 When an incoming point-to-point call to a role is answered, all other FTS sharing the same role shall be released from the incoming point-to-point call.

2.1.19 The minimum and maximum number of terminals for a role to be selected at the same time should be system configurable.

2.1.20 Each role transaction shall be logged.

2.3 Handling of call priorities

2.3.1 It shall be possible for calls to be answered automatically according to incoming call priority.

2.3.2 The FTS shall support MLPP to ensure calls of a lower priority are pre-empted.

2.3.3 In order to meet call priorities, established calls shall be able to be either put on hold or terminated (pre-empted).

2.3.4 An outgoing call request of higher priority than an established call shall take precedence over the established call.

2.3.5 Where pre-emption occurs, an advisory indication should be provided to the pre-empted parties.

2.4 Call management

2.4.1 The FTS shall/should be capable of handling the following calls:

a) point-to-point calls

b) group voice calls

c) broadcast voice calls

d) multi-party voice calls

e) calls to the trackside lines and telephones (legacy analogue systems)

f) calls to external networks

2.4.2 FTS shall be capable of initiating GSM-R calls (national or international) using MSISDN or Functional number.

2.4.3 It should be possible to make a call request to the MSISDN number of a controller terminal.

Incoming Call Management

2.4.4 The FTS shall indicate incoming calls and provide an audible and visual indication upon receipt of an incoming call.

2.4.5 The FTS should be capable of displaying a list of all incoming calls, which can be displayed permanently or selected by the user.

2.4.6 Calls displayed on the incoming calls list shall be displayed using the originator's functional identity or MSISDN and the eMLPP.

2.4.7 Calls in the incoming calls list should appear in order of priority and listed in chronological order within the same priority.

2.4.8 An incoming call should be able to be selected from the incoming calls list.

Call hold

2.4.9 The FTS shall enable an ongoing call to be placed on hold.

2.4.10 Once a call has been placed on hold it shall be distinguished from other calls on the FTS.

2.4.11 Placing a call on hold shall enable the user to make and receive other calls.

2.4.12 Placing a point-to-point call on hold shall cause others involved in the call to receive an indication that the call has been placed on hold.

Indications

2.4.13 The FTS shall/should distinguish between calls by displaying the following information:

a) call types
b) group ID
c) functional codes
d) system of origin (e.g. external network)

2.4.14 The FTS shall display the identity of the call originator, where possible.

2.4.15 The FTS shall additionally display the functional identify of a group call originator.

2.5 Call Handling

Point-to-Point Calls

2.5.1 The controller shall/should be able to initiate a point-to-point call to a train:

a) by selecting the call type
b) by entering the train number or the stock number (i.e. UIN)
c) by entering a function code or selecting one out of a list

d) by entering or selecting one out of a list of International Codes for outgoing calls to international trains

2.5.2 The controller should be able to initiate a point-to-point call to a train by selecting a registered cab mobile (i.e. CT2) / stock number (CT3&4) from a train list.

2.5.3 It shall/should also be possible for the controller to initiate a point-to-point call:

a) from the phonebook

b) from the call list including calls to international numbers

c) by directly entering the a number

d) by using a direct access button

2.5.4 The point to point voice calls shall be full duplex, permitting both parties to talk simultaneously.

2.5.5 The functional identity (which may contain an alphanumeric description) of the calling party, when available, shall be displayed.

Group and Broadcast Voice Calls (VGCS or VBS)

2.5.6 It shall be possible for a controller to establish, join, participate, leave and terminate voice group and broadcast calls in a pre-defined geographical area.

2.5.7 It shall/should also be possible for the controller to initiate voice group and broadcast calls:

a) from the phonebook

b) from the call list

c) by directly entering the a number

d) by using a direct access button

2.5.8 A list of service areas and a list of group ID's for group calls should be available on the controller terminal.

2.5.9 The service areas and group IDs should be displayed using a name on the controller terminal display rather than the numbering used in the network for ease of use by the controller's terminal display.

Railway Emergency Group Calls

2.5.10 It shall be possible for the controller to distinguish between railway emergency group call areas and other group call areas on the controller terminal.

2.5.11 It shall be possible for a controller to initiate a railway emergency call with the minimum of interaction with the controller terminal, taking into consideration the potential for user error.

2.5.12 The emergency call key shall be red.

2.5.13 An incoming railway emergency call shall be clearly identified and displayed to the controller at the top of the calls waiting list with the initiator's functional identity.

2.5.14 The controller terminal shall alert the controller of an incoming railway emergency call (e.g. using an audible tone and/or visual indication).

2.5.15 It shall be possible to configure the system to automatically connect an incoming railway emergency call to the controller terminal.

2.5.16 An incoming railway emergency call should be automatically connected if there is no ongoing call.

2.5.17 An ongoing call of a lower priority shall be placed on hold or terminated when an incoming railway emergency call is connected.

2.5.18 If there is an ongoing railway emergency call, then any subsequent incoming railway emergency call shall be placed in the call queue and automatically connected when the ongoing call is terminated.

2.5.19 The controller terminal shall ask the controller a conformation to terminate a railway emergency call.

2.5.20 The controller terminal shall ask the controller a conformation to leave a railway emergency call.

2.5.21 A mechanism shall be provided by the system for terminating the railway emergency call in case the call remain kept without termination.

2.5.22 Other details concerning requirements for Railway emergency calls are given in section 13.

Multi-Party Calls

2.5.23 The controller should be able to initiate a multi-party call either manually or automatically using pre-defined multi-party calls.

2.5.24 Pre-defined multi-party call function provide a one-click call setup to a pre-defined number of participants.

2.5.25 Pre-defined multi-party call can be configured centrally and allow the establishment of the multi-party call to be initiated automatically.

2.5.26 All multi-party call participants should be displayed in a list with their current call status (ringing, connected or disconnected).

2.5.27 The system should be capable of handling multi-party calls with at least 20 participants.

2.5.28 Multi-party calls may include:

a) controllers

b) mobile users

c) users within other telecommunication networks

Call Forward Unconditional (CFU)

2.5.29 The controller should be able to select a CFU target, which maybe pre-defined.

2.5.30 Activation of CFU should be possible only if there are no active, waiting or held calls.

2.6 Controller terminal

2.6.1 It shall/should be possible to connect the following devices to the controller terminal:

a) handset

b) headset

c) free set (e.g. a separate microphone and speaker, or a combined microphone and speaker)

d) a separate Push-to-Talk (PTT) button

2.6.2 The controller shall be able to adjust the audio devices volume that are connected to the controller terminal within a predefined range.

2.6.3 It shall be possible to switch between all audio devices connected to the controller terminal, including when in an ongoing call.

2.6.4 When the controller is participating in a call, only one audible device connected to the controller terminal shall be active.

2.6.5 The controller terminal should acknowledge user interaction with an audible tone (e.g. "key click").

2.6.6 The controller should be able to switch off the interaction tone via a menu option on the controller terminal.

2.6.7 It should be possible to monitor the operational status of a controller terminal remotely.

2.6.8 It should be possible to push software updates to the controller terminal

2.6.9 The controller terminal should prompt the controller to initiate a software update automatically upon receipt.

2.6.10 It should be possible for the controller to initiate a software update at a convenient opportunity (e.g. during an operationally quiet period) following receipt of software notification message.

2.6.11 The controller terminal should automatically generate a message that confirms a software update has been successfully completed.

2.6.12 The controller terminal display should be adjustable.

2.6.13 The following information and features should be available on the terminal:

a) date and time

b) incoming calls waiting list

c) incoming / outgoing call log

d) list of trains running actually in the controller area

e) a set of direct access buttons for point-to-point and group/broadcast calls

f) a set direct access buttons for pre-defined conferences

2.6.14 The controller terminal may display or include the following features :

a) ring signal and the speech volume in an active call

b) online help

c) password

d) brightness of the display

e) the use of a headset

f) personal telephone directory entries

g) direct access buttons

h) color profile

i) the use of key clicks

2.6.15 The controller should be able to adjust the brightness and contrast of buttons, indicator lights and displays according to the ambient lighting, with the minimum of interaction (e.g. through the use of a single control).

2.6.16 It should be possible to backup data stored locally on the FTS.

2.7 Short Messages – SMS

2.7.1 The FTS should support the sending and receiving of SMS text messages using free form, templates and pre-defined messages.

2.7.2 It should be possible to simultaneously send an SMS text message to subscribers listed in the controller terminal's associated phonebook.

2.7.3 The controller terminal should support the displaying of delivery notifications associated with sent SMS text messages.

2.7.4 The FTS should log all SMS text messages sent and received.

2.7.5 The controller should be able to access the SMS text message log.

2.7.6 The controller should be able to send or receive text messages when participating in an ongoing call.

2.7.7 The controller terminal should provide the controller with an audible and / or visual indication that an SMS text message has been received.

2.7.8 The controller terminal should support the displaying of the functional identity of the sender of an SMS text message (where possible).

2.7.9 The controller terminal should provide the controller with the option to respond to the sender of an SMS text message using either SMS text messaging or a point-to-point voice call.

2.8 Train Location System (TLS) for controllers

2.8.1 As soon as a train is entering / leaving the controller responsible area the train number should be displayed /removed on the controller terminal display.

2.8.2 For a train entering / leaving a controller responsible area, the update delay should not be longer than 30 seconds.

2.8.3 The train number should be deleted when one of the following conditions is achieved:

a) the train leaves the managed area

b) the train has deregistered

c) the train switches off its transmission equipment

2.8.4 The controller should get only the list of trains for which they are responsible.

2.8.5 It should be possible for the controller's terminal to display simultaneously a minimum of 15 trains on one page without the need for the controller to scroll.

2.8.6 It should be possible for the controller to easily call or send a SMS message to the displayed train by selecting the train from the train list.

2.9 Phonebook

2.9.1 The controller terminal should be associated with a phonebook that is stored locally.

2.9.2 The capacity of the controller terminal should be capable of storing a minimum of 100 numbers.

2.9.3 The controller terminal phonebook should be configurable locally via a menu option.

2.9.4 The controller terminal phonebook should include a mechanism that enable the content of the phonebook to be searched by the user with the minimum of interaction.

2.9.5 A global electronic telephone directory should be available on the FTS for all users. It should be configured centrally.

2.9.6 The telephone directory should contain functional numbers, ISDN, MSISDN, REC, VGCS and VBS numbers.

2.9.7 The global directory should be capable of storing a minimum of 500 predefined entries.

2.10 DSD Alarms

2.10.1 Driver Safety Device (DSD) alarm messages from cab radios shall be supported.

2.10.2 If DSD is implemented, the UI shall/should display the following information when a DSD alarm message is received:

a) train number

b) engine number;

c) location information

2.11 Network Management System

2.11.1 The Fixed Terminal System shall be equipped with a supervision system or network management system.

2.12 Activity Log

2.12.1 The FTS should be capable of recording all terminal activity for a period of at least 48 hours.

2.12.2 The controller terminal's recorded activity should include the following:

a) Logging activities of each operator. i.e. user log in and out, role activation and deactivation

b) information about failures

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