

# SLOVENSKI STANDARD

## SIST-TS CLC/TS 50459-2:2021

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**Železniške naprave - Komunikacijski, signalni in procesni sistemi - Evropski sistem za vodenje železniškega prometa - Vmesnik človek-stroj - 2. del: Ergonomska razporeditev informacij GSM-R**

Railway applications - Communication, signalling and processing systems - European Rail Traffic Management System - Part 2: Ergonomic arrangements of GSM-R information

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Bahnanwendungen - Telekommunikationstechnik, Signaltechnik und Datenverarbeitungssysteme - Europäisches Leitsystem für den Schienenverkehr - Mensch-Maschine Schnittstelle - Teil 2: Ergonomische Anordnung der GSM-R Informationen

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Applications ferroviaires - Systèmes de signalisation, de télécommunications et de traitement - Système européen de gestion du trafic ferroviaire - Interface de conduite - Partie 2: Aménagement ergonomique des informations GSM-R

**Ta slovenski standard je istoveten z: CLC/TS 50459-2:2021**

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**ICS:**

03.220.30	Železniški transport	Transport by rail
13.180	Ergonomija	Ergonomics
35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

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**CLC/TS 50459-2**

March 2021

ICS 03.220.30; 13.180; 35.240.60

Supersedes CLC/TS 50459-2:2015

English Version

**Railway applications - Communication, signalling and processing  
systems - European Rail Traffic Management System - Part 2:  
Ergonomic arrangements of GSM-R information**

Applications ferroviaires - Systèmes de signalisation, de  
télécommunications et de traitement - Système européen  
de gestion du trafic ferroviaire - Interface de conduite -  
Partie 2: Aménagement ergonomique des informations  
GSM-R

Bahnanwendungen - Telekommunikationstechnik,  
Signaltechnik und Datenverarbeitungssysteme -  
Europäisches Leitsystem für den Schienenverkehr - Teil 2:  
Ergonomische Anordnung der GSM-R Informationen

This Technical Specification was approved by CENELEC on 2021-02-08.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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**CLC/TS 50459-2:2021 (E)****European foreword**

This document (CLC/TS 50459-2:2021) has been prepared by CLC/SC 9XA "Communication, signalling and processing systems", of Technical Committee CLC/TC 9X "Electrical and electronic applications for railways".

This document supersedes CLC/TS 50459-2:2015.

CLC/TS 50459-2:2021 includes the following significant technical changes with respect to CLC/TS 50459-2:2015:

- updated general principles for the presentation of ERTMS/ETCS/GSM-R information correlated with ERA document ERA\_ERTMS\_015560;
- updated ergonomic arrangements in line with EN 16186 series.

CLC/TS 50459 series consists of the following parts under the general title *Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — Driver-Machine Interface*:

- *Part 1: General principles for the presentation of ERTMS/ETCS/GSM-R information*;
- *Part 2: Ergonomic arrangements of GSM-R information* [the present document];
- *Part 3: Ergonomic arrangements of non ETCS information*.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

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## Introduction

This document should be read in conjunction with ERA\_ERTMS\_015560, *ETCS Driver Machine Interface*, and the EN 16186 series, *Railway applications — Driver's cab*.

The CLC/TS 50459 series contains the ergonomic arrangements of information on the ERTMS/DMI Display (Control Command Display (CCD) and Train Radio Display (TRD)). Most items are illustrated with an example.

The reasons for defining the ergonomics of the DMI are as follows:

- achieving harmonized and coherent presentation for ERTMS/ETCS and NTC information;
- defining Driver-Machine Interface ergonomics that is compatible with agreed interoperable ERTMS specifications;
- to reduce the risk of incorrect operation by a driver;
- facilitating train operation with a unified ergonomics, hence reducing the cost of driver training;
- better understanding of the tasks to be performed;
- increasing speed and accuracy of driver actions.

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**CLC/TS 50459-2:2021 (E)****1 Scope**

This document describes from an ergonomic point of view how GSM-R information will be arranged and displayed. More specifically it covers information that is out of the scope of ERA document ERA\_ERTMS\_015560. This document describes more ergonomic details than currently provided by the GSM-R specifications.

This document defines the ergonomics for the Driver-Machine Interface (DMI) for the stand alone ERTMS/GSM-R Voice Radio Systems.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16186-2, *Railway applications - Driver's cab - Part 2: Integration of displays, controls and indicators*

EN 16186-3:2016+A1:2018, *Railway applications - Driver's cab - Part 3: Design of displays*

CLC/TS 50459-1:2021, *Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — Driver-Machine Interface - Part 1: General principles for the presentation of ERTMS/ETCS/GSM-R information*

**3 Terms, definitions and abbreviated terms**

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**3.1 Terms and definitions**

For the purposes of this document, the terms and definitions given in CLC/TS 50459-1 and the following apply.

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ISO and IEC maintain databases of terminology for use in standardization at the following addresses:

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— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <https://www.iso.org/obp>

**3.1.1****auto-answered**

automatically answered from a mobile station to a call if the incoming call is of or exceeds a defined priority level

[SOURCE: EIRENE]

**3.1.2****broadcast call**

call made to all members of a pre-defined group within a local geographical area

Note 1 to entry: Only the initiator of the call may talk, with all other group members listening only.

**3.1.3****call forwarding unconditional****CFU**

supplementary service which permits a called mobile subscriber to have the network send incoming calls to another number no matter what the condition of the termination (radio)

**3.1.4****call type**

prefix used to identify the user number dialled

Note 1 to entry: The first digit of a National EIRENE Number (see EIRENE SRS Section 9) defines how to interpret the numbers that follow.

Note 2 to entry: Of particular relevance to this document are:

- Call Type 1 – reserved for short codes;
- Call Type 7 – used for train controllers.

**3.1.8****chief conductor**

member of the train crew with overall responsibility for passenger-related railway activities on-board the train

**3.1.9****conductor**

member of the train crew with some degree of responsibility for passenger-related railway activities on-board the train

**3.1.10****controller  
dispatcher**

individual responsible for the conduct of some aspect of train operations

Note 1 to entry: For the purposes of this document, the following functional roles of controllers are defined:

— primary controller;

— secondary controller;

— power supply controller.

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**3.1.11****downlink**

radio transmission path from a base station to a mobile station

**3.1.12****EIRENE**

railway telecommunications system based on the ETSI GSM standard, which complies with all related mandatory requirements as specified in the EIRENE FRS and SRS

Note 1 to entry: An EIRENE system could also include optional features and these are then implemented as specified in the EIRENE FRS and SRS. The EIRENE System includes terminals.

**3.1.13****flash SMS**

type of SMS that appears directly on the main screen without user interaction and is not stored in the inbox

**3.1.14****function code**

code which is used as an identification of, for example, the person or equipment on a particular train, or a particular team within a given area

**CLC/TS 50459-2:2021 (E)****3.1.15****functional identity**

full alphanumeric description of the function performed by a called or calling party within the functional numbering scheme, identifying them by function or role rather than by a specific item of radio equipment or user subscription

Note 1 to entry: The functional identity can include characters and/or numbers.

**3.1.16****functional number**

full number used within the functional addressing scheme to contact an end user/system by function or role rather than by a specific item of radio equipment or user subscription

EXAMPLES Train Running Number and Locomotive Number.

**3.1.17****group call**

call made to all members of a pre-defined group within a local geographical area

Note 1 to entry: Only one member of the group may talk at any instant, with all other group members listening only.

**3.1.18****group ID****group identification number**

three digit number (defined in EIRENE SRS Table 9-8) used within the EIRENE Numbering Plan

**3.1.19****idle state**

state of a cab radio when it is connected to a network but there are no active calls

**3.1.20****active state**

state of a cab radio when it is connected to a network and there is at least one call connected or on hold

**3.1.21****multiparty call**

voice communication method whereby a number of parties defined by the call initiator may participate in the call and whereby all parties may talk simultaneously

**3.1.22****point-to-point call**

voice communication method whereby two parties defined by the call initiator may participate in the call and whereby both parties may talk simultaneously

**3.1.23****power supply controller**

controller responsible for the management of the traction power supply

**3.1.24****primary controller**

co-ordinator of train emergency calls who is normally responsible for the operation of a designated area of track

Note 1 to entry: The location and direction of movement of any particular train permits the unique identification of a primary controller. The exact responsibilities of the primary controller are determined on a national basis.

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**3.1.25****secondary controller**

train controller who holds responsibility for the safe running of trains on a designated area of track

EXAMPLE a signaller

Note 1 to entry: Secondary Controllers requires the facility to communicate with trains in all situations in order to perform their function. The split of responsibilities between primary controllers and secondary controllers is determined on a national basis.

**3.1.26****shunting group**

group of people manoeuvring trains in order to change the formation of the trains

Note 1 to entry: EIRENE also uses the term 'Shunting team' for this.

**3.1.27****sidetone**

form of feedback where transmitted audio signal is instantly introduced at a low level into the receiver (earpiece) of the same handset

Note 1 to entry: It only applies when the handset is off-hook.

**3.1.28****uplink**

radio transmission path from a mobile station to a base station

**3.2 Abbreviated terms**

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For the purposes of this document, the following abbreviated terms apply.

ADIF	Administrador de infraestructuras ferroviarias
CCD	Control Command Display
DMI	Driver-Machine Interface
DTMF	Dual-Tone Multi-Frequency
EIRENE	European Integrated Railway Radio Enhanced Network
ERA	European Rail Agency
FC	Function Code
FRS	Functional Requirements Specification
HMI	Human Machine Interface
IC	Intercom
PA	Public Address
PTP	Point-To-Point
PTT	Push To Talk
REC	Railway Emergency Call
RU	Railway Undertaking
SIM	Subscriber Identity Module
SMS	Short Message System
SNCF	Société nationale des chemins de fer français
SRS	System Requirements Specification

**CLC/TS 50459-2:2021 (E)**

TCMS	Train Control and Monitoring System
TRD	Train Radio Display
VBS	Voice Broadcast Service
VGCS	Voice Group Call Service

NOTE For practical reasons, in this document GSM-R is used instead of ERTMS/GSM-R.

**4 General DMI-related principles****4.1 General ergonomic principles**

The relevant requirements of the EN 16186 series shall be followed.

The GSM-R DMI shall follow the main ergonomic principles as described in CLC/TS 50459-1.

Any additional requirements that are specific to GSM-R are defined in this document.

**4.2 Hardware****4.2.1 General**

It should be possible to pick up and return the handset 'blindly' (from the driving position) and with one hand. EN 16186-2 shows the preferred location of the handset.

GSM-R shall automatically detect that the handset is off-hook.

As an alternative to a handset and loudspeaker, it should be possible for a radio to use a hands-free microphone and loudspeaker. The hands-free microphone shall include a PTT function that is used when the driver wants to speak during group calls. The PTT function may also be used during other calls.

**4.2.2 Use of alternative layouts for the DMI**

For existing systems or systems at an advanced stage of development alternative DMI layouts may be used provided that they meet the functional requirements.

As indicated in EN 16186-2, it is possible to meet the functional requirements of the GSM-R DMI with a simpler driver interface than that shown in the examples within this document.

**4.3 Areas on the DMI**

GSM-R DMI's shall have the following areas: input and monitoring. Areas C, F and S3 are used to show the function of buttons through which information is input. Areas A, S1 and S2 are used to present information to the user. This is illustrated in Figure 1 — Areas of the DMI screen along with their relative sizes (in cells). Refer to CLC/TS 50459-1:2021, 4.1.3 for a fuller explanation of sizes and cells.

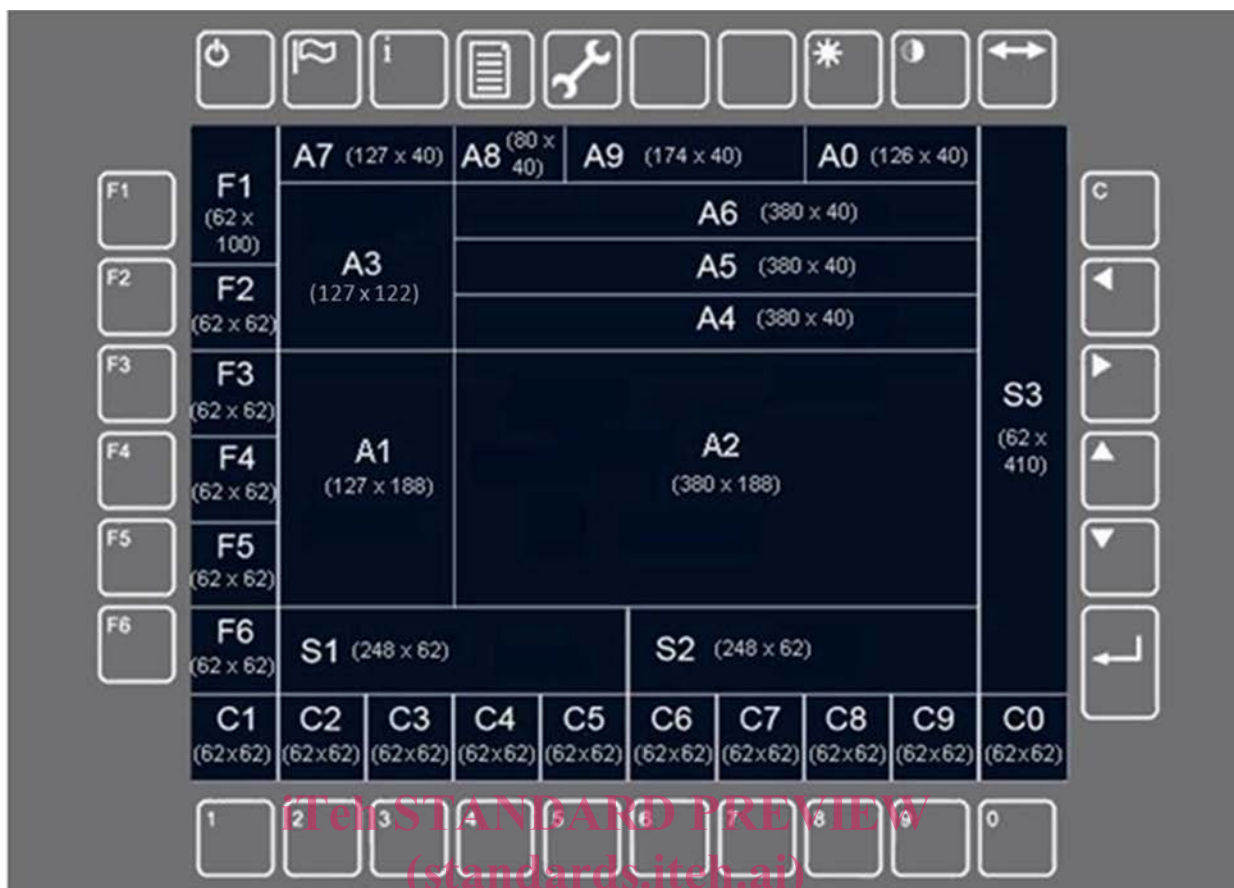


Figure 1 — Areas of the DMI Display

NOTE This layout is in line with UIC 612-04. The functions associated with the various areas and keys are given in Table 1 and Table 2 below. The descriptions are based on those given in UIC 612-04 with re-wording where it is considered helpful.

Table 1 — Description of functions used in each are

Field	Description
A1	GSM-R symbol showing call status
A2	announcement and communication field <ul style="list-style-type: none"> <li>— GSM-R information</li> <li>— flash-SMS (incoming text, at least 160 digits without scrolling)</li> <li>— announcement of other than flash-SMS (symbol: envelope)</li> <li>— other text and symbols</li> </ul>
A3	reserved for future use, e.g. a Driver Advisory System
A4	text heading
A5	— for train radio mode: current call number — for shunting mode: current shunting group number
A6	title of the TRD screen
A7	— for train radio mode: train number — for shunting mode: shunting area number and 2-digit group number if applicable
A8	function code