REFERENCE O-3001-2 version 1.1.0	
Company / Organization	**UIC ERTMS/GSM-R Operators and Functional Group** **UNITEL Technical Group**

Test specifications for GSM-R MI related requirements Part 2: EDOR

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Document Data Sheet

Title of the document	Test specifications for GSM-R MI related requirements; Part 2: EDOR
Reference, version number and date	REFERENCE O-3001-2 version 1.1.0; Date: 08.04.2021
Number of pages	45
Prepared by	UIC, UNITEL
Approved by	UIC ERIG Chairman (Robert Sarfati)

Evolution Sheet

	Date	Author	Object of revision
x.0.1	2016-09	Funkwerk Systems	Creation
x.0.2	2016-09	Funkwerk Systems	Update after review Alstom
x.0.3	2016-10	Funkwerk Systems	Update after review TIG
x.0.4	2016-10	Funkwerk Systems	Editorial changes
x.0.5	2017-01	Funkwerk Systems	Changes to +CGEQREQ
x.0.6	2017-01	Funkwerk Systems	Editorial changes
x.0.7	2017-02	Funkwerk Systems	Added new TC to test mandatory AT-commands from FFFIS for EuroRadio
x.0.8	2017-03	Funkwerk Systems	Added IP address parameter to CGDCONT
1.0.0	2017-05	UIC	Approval by UIC
1.0.1	2019-12	Funkwerk Systems	Changes after Ad Hoc Group review
1.0.2	2019-12	Funkwerk Systems	Changes after UTG review
1.0.3	2020-01	UIC	Editorial changes
1.0.4	2020-06	Funkwerk Systems	Adaption of ERA-OPI-2020-2 [CR 9253 (ERA 5040)]
1.0.5	2021-02	UIC	Test 6.3.6: Precondition updated according NoBos comment
1.1.0	2021-04	UIC	Final version

Contents

1 Object

1.1 Purpose of the document

This document contains the test cases that are necessary for the functional validation of an ETCS data only radio according to the EIRENE specifications FRS (see [2]) and SRS (see [3]). The test cases cover all the requirements that have been identified as mandatory for interoperability (MI) according to the EIRENE specification and which can be validated using functional tests. QoS and performance requirements for safety and non-safety related data communications are not in the scope of this document.

1.2 Abbreviations

AC	Access Code
AT	Attention command set
BC	Breakout Code
BTS	Base Transceiver Station
CC	Country Code
CN	Coach Number
CR	Cab Radio
CHPC	Confirmation of High Priority Calls
CLIP	Calling Line Identification Presentation
CoLP	Connected Line Identification Presentation
CS	Circuit Switched
CTS	Centralized Train Signalling
DL	Downlink
DSD	Driver Safety Device
EDOR	ETCS data only radio
EIRENE	European Integrated Railway Radio Enhanced Network
eMLPP	enhanced Multi-Level Precedence and Pre-emption
ETCS	European Train Control System
EN	Engine Number
eREC	enhanced Railway Emergency Call
ETSI	European Telecommunications Standards Institute
FFFIS	Form Fit Functional Interface Specification
FI	Functional Identity
FC	Function Code
FN	Functional Number
FRS	Functional Requirements Specification
GBR	Guaranteed Bitrate

GCA	Group Call Area
GID	Group call Identity
GPH	General Purpose Handheld
GSM	Global System for Mobile Communications
GSM-MT	GSM Mobile Termination
GSM-R	GSM-Railway, GSM train radio system
ISDN	Integrated Services Digital Network
LAS	Link Assurance Signal
LN	Location Number
MCC	Mobile Country Code
MLPP	Multi-Level Precedence and Pre-emption
MMI	Man – Machine Interface
MNC	Mobile Network Code
MORANE	Mobile Radio for Railway Networks in Europe
MPTY	Multiparty Supplementary Services
MS	Mobile Station, GSM-R mobile phone with a valid SIM Card for the test
MT	Mobile Termination/Terminated
NDC	National Destination Code
OPH	Operational Purpose Handheld
OPS	Operational Purpose Handheld for Shunting
OTA	Over The Air
OTDI	Originator To Dispatcher Information
PA	Public Address
PC	Primary Controller
PDP	Packet Data Protocol
PFN	Presentation of Functional Number
PPP	Point to Point Protocol
PS	Packet Switched
PSC	Power Supply Controller
PSK	Phase Shift Keying
PTP	Point-to-Point call
PTT	Push to Talk
QoS	Quality of Services
RBC	Radio Block Centre
REC	Railway Emergency Call
SC	Secondary Controller
SDU	Service Data Unit
SEC	Shunting Emergency Call

SGC	Shunting Group Call
SIM	Subscriber Identification Module
SMS	Short Message Service
SN	Stock Number
SN	Subscriber Number
SRS	System Requirements Specification
TE	Terminal Equipment
TN	Train Number
UIC	Union Internationale des Chemins de Fer
UL	Uplink
USSD	Unstructured Supplementary Service Data
UUIE	User-to-User Information Element
UUS	User-User Signalling
VBC	Voice Broadcast Call
VBS	Voice Broadcast Service
VGC	Voice Group Call
VGCS	Voice Group Call Service

1.3 Reference Documents

[1]*   EDOR User's Manual

[2]   UIC, EIRENE Functional Requirements Specification
Doc.-N°: UIC CODE 950 v 0.0.2 | version: 8.0.0

[3]   UIC, EIRENE System Requirement Specification
Doc.-N°: UIC CODE 951 v 0.0.2 | version: 16.0.0

[4]   COMMISSION REGULATION (EU) 2016/919 of 27 May 2016 on the technical
specification for interoperability relating to the 'control-command and signalling'
subsystems of the rail system in the European Union

[5]   UIC, FFFIS for GSM-R SIM Cards
Doc.-N°: P38 T 9001 | version: 5.0.0

[6]   UIC, Radio Transmission FFFIS for EuroRadio
Doc.-N°: A 11 T 6001 | version 13.0.0 (2015-12)

[7]   ETSI Technical Specification RT, GPRS/EGPRS requirements for ETCS
Doc.-N°: ETSI TS 103 328 | version 1.2.1 (2016-10)

[8]   UIC, Test specifications for GSM-R MI related requirements, Part 1: Cab Radio
Doc.-N°: UIC O-3001-1 | version: 1.1.0

[9]   UIC, Test specifications for GSM-R MI related requirements, Part 3: SIM Cards
Doc.-N°: UIC O-3001-3 | version: 1.1.0

[10]   UIC, Test specifications for GSM-R MI related requirements, Part 4: Network
Doc.-N°: UIC O-3001-4 | version: 1.2.0

[11]   ETSI Technical Specification RT; Commands necessary for mobile radio equipment
operation on railways
Doc.-N°: ETSI TS 103 368 | version: 1.1.1 (2016-11)

[11]   COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019
amending Commission Regulations (EU) No 321/2013, (EU) No 1299/2014, (EU) No
1301/2014, (EU) No 1302/2014, (EU) No 1303/2014 and (EU) 2016/919 and
Commission Implementing Decision 2011/665/EU as regards the alignment with
Directive (EU) 2016/797 of the European Parliament and of the Council and the
implementation of specific objectives set out in Commission Delegated Decision (EU)
2017/1474

[12]   Opinion on errors ERA/OPI/2020-2

* Document [1] refers to the User's Manual of the tested type of EDOR. It is imperative to use the EDOR User / Interface Manual corresponding to the tested version of the ETCS data only radio.

Note: The applicable mandatory specifications listed in TSI CCS 2016/919/EU [4] are unchanged in CIR (EU) 2019/776 [11].

2 Test Configuration

2.1 Overview

Following components of the EIRENE GSM-R system are needed to execute the tests:
- GSM-R Network(s)
- ETCS data only radio (device under test)
- entity at trackside to act as a responder for data communications (can be either a test tool responder or real RBC)
- entity on On-board side that shall stimulate EDOR according to EURORADIO FFFIS interface (can be either a test tool or a real On-board Unit)
- SIM Cards

2.2 Equipment required

- GSM-R network(s) operating in the R-GSM 900 band with CS and PS domain
- GSM Abis-tracer or GSM A-tracer, in order to check the contents on the messages exchanged between mobiles and network when required
- ETCS data only radio (device under test)
- ETCS (RBC) and non-ETCS entities in CS and PS domain GSM-R SIM cards with all the services and features provisioned and configured for the appropriate mobile user and function
- SIM card editor, in order to be able to modify the services and features provisioned and the configuration on the SIM cards for the different test requirements
- User's Manual of the tested device
- User's Manual of the other mobiles involved testing

2.3 Network configuration

It is recommended that GSM-R network is fully compliant to the requirements listed in the set of specifications applicable to GSM-R network, see [4] and [7]. However, it is noted that some of the features are not specifically required for EDOR testing.

It must be possible to adjust various functions within the network in order to carry out the ETCS data only radio tests. The GSM-R network configuration shall at least support two location / group call areas.

The data applications for ETCS and non-ETCS services belong to the test environment and are provided by the test lab operator or the customer.

The configuration of the used GSM-R network, supplier and the software release of the network components such as e.g. network switching subsystem, base station subsystem etc. must be documented in the test protocol.

2.4 ETCS data only radio configuration

2.4.1 Software

The software release of the ETCS data only radio must be declared in the test protocol.

2.4.2 Hardware

The hardware release of the ETCS data only radio must be declared in the test protocol.

2.4.3 SIM cards

The SIM cards need to be compliant to [5] and will be provided by the network operator or test lab operator. Optionally the SIM card compliance can be verified by [9].

3 Completion of the Functional tests

3.1 General

The following chapters contain a detailed description of all functional tests provided for the ETCS data only radio.

3.2 Structure of the tests

The tests are structured as follows:
- test title
- purpose of the test
- precondition for the test
- reference to specific requirement(s)
- completion of the test in individual steps

Where the term "User's Manual" is used, the required action and/or any audible and/or visual indication

has to be referred to the User's Manual of the tested ETCS data only radio.

3.3 Completion of the tests

The tests are carried out with at least one ETCS data only radio (EDOR). If other subscribers are used they are identified by MS-A, MS-B, MS-C (for mobile subscribers) or TE1, TE2 (for terminal equipment).

The entire series of tests has to be completed successfully once. The order of the tests during the test run might vary.

If the result of a test case is PASSED then it does not need to be redone.

If the result of a test case is FAILED, the cause of the failure should be determined.

- If the failure is not due to the EDOR (equipment under test) the test case needs to be retested after correction of the fault. If the 1st test result is FAILED and the 2nd result is PASSED then the test case needs to be retested again. The test case is passed only if the result was PASSED already at 1st test execution or PASSED within 2nd and 3rd execution. Where the procedure section of a test case contains "- none -" that means no action to be performed on the tested device, only on other devices (e.g. TE1 or MS-A).

- If the failure is due to the EDOR (equipment under test) this shall be recorded in the test report.

The priority and severity management of an issue that caused the test to fail is not subject of this document.

Most of the test cases (excluding test cases 6.210 and 6.3.7) described in Chapter 6 can also be executed on Mobile Terminal (the one that EDOR is equipped with) standalone. Due to EDOR architecture described in SRS ref. [3] chapter 16.2, if Mobile Terminal is compliant to EIRENE requirements as proved by test cases in the present O-3001 document, compliance is automatically extended to the whole EDOR; without need of repeating test execution.

3.4 ETCS data only radio test configuration

The following requirements or settings apply to the ETCS data only radio test grouping:

Test system requirements:

1   EIRENE compliant GSM-R network see section 2.3

2   ETCS data only radio compliant to [4] and [7]

3   Terminal equipment

4   The interface between the application and GSM-R modem can be monitored

Test unit requirements

1   Equipped with a plug-in SIM card according to [5]

2   Own phone number (MSISDN) entered on the SIM

3   Notifications of voice broadcast and voice group calls should be prevented by the SIM-card configuration for the ETCS application. This ensures that the data flow is not disturbed by notifications

4   ETCS data only radio is switched on unless other state is specified in precondition

Further requirements

The tests will be performed with a test application (e.g. with a terminal software) connected through a serial interface to the test equipment. With this test application manual AT commands or predefined scripts can be sent to the test equipment.
The feedback of the test equipment will be outputted to the test application through the same interface.

If required, the necessary deviations are listed in the individual test cases. The used test environment shall be documented in the test report

4 EIRENE Requirements for Cab Radio: Mandatory for Interoperability

See O-3001-1 Test specifications for GSM-R MI related requirements, Part 1: Cab Radio [8]

5 EIRENE Requirements for Cab Radio: Mandatory for Interoperability – optional components

See O-3001-1 Test specifications for GSM-R MI related requirements, Part 1: Cab Radio [8]

6 EIRENE Requirements for ETCS data only radio: Mandatory for Interoperability

6.1 General functions

6.1.1 Main components of the ETCS data only radio

Purpose: This test is to show that the main components of the EDOR are all in place and working.

Precondition: ETCS data only radio test configuration.

References:
EIRENE FRS :   § 16.6.1
EIRENE SRS :   § 16.2.2

Test Procedure:

Step	Procedure	Result / Effect
1	Check the following components of EDOR: – Two (or more) GSM mobile terminations – Two (or more) GSM mobile equipment(s) – Two (or more) GSM SIM card(s) – Standardized train-borne ETCS interface, one for each GSM mobile termination, as specified in "FFFIS for EURORADIO" specification)	Components of EDOR are all in place and working

6.1.2 Handling of Classmark 2 information element

Purpose: This test is to show that the EDOR fill the "notification part" of the Mobile Station Classmark 2 Information Element with "no VGCS / VBS capability or no notifications wanted".

Precondition: ETCS data only radio test configuration.

Use of ETCS only SIM card to obtain the required information.

EDOR is switched on.

References:

EIRENE SRS : § 16.3.9

ETSI: TS 124 008

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipment TE1	**EDOR**	Terminal equipment TE1
1	Set automatic call answering to *disable*		ATS0=0		OK
2	Set the escape sequence to "+++"	**ATS2=43**		**OK**	
3	Select bearer service type	**AT+CBST=70,0,0**	AT+CBST=70,0,0	**OK**	OK
4	Initiate data call to Terminal equipment	**ATD**<MSISDN>			RING
5	Accept incoming call		ATA	**CONNECT 4800**	CONNECT 4800
6	Check if data transmission in both directions possible				
7	Switch from data to command mode	**+++**		**OK**	
8	Terminate data call	**ATH**		**OK**	NO CARRIER
9	Check trace for Classmark 2 Information Element (DL_ESTABLISH_REQ message): **-----0-- VBS: no VBS capability or no notifications wanted : 0** **------0- VGCS: no VGCS capability or no notifications wanted : 0**				

*ETCS default values

6.1.3   ETCS default configuration

Purpose: This test is to show that the EDOR fulfil the factory settings concerning the commands relating to TA-TE interface operation.

Precondition: ETCS data only radio test configuration.

References:

EIRENE SRS :   § 16.3.4

EURORADIO :   4.4.3.1, 4.4.13.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipmentTE1	**EDOR**	Terminal equipment TE1
1	Set to factory-defined configuration	**AT&F0**		**OK**	
2	Read value of escape code character	**ATS2?**		**128** **OK**	
3	Read value of command line termination character	**ATS3?**		**013** **OK**	
4	Read value of response formatting character	**ATS4?**		**010** **OK**	
5	Read value of automatic answer	**ATS0?**		**001** **OK**	
6	Read fixed DTE rate	**AT+IPR?**		**+IPR: 9600** **OK**	
7	Read current value of character framing	**AT+ICF?**		**+ICF:3,3** **OK**	
8	Read current value of flow control	**AT+IFC?**		**+IFC:2,2** **OK**	
9	Read current value bearer service	**AT+CBST?**		**+CBST:70,0,0** **OK**	
10	Read current value of connected line identification presentation	**AT+COLP?**		**+COLP:0,x** **OK**	
11	Read current value of calling line identification presentation	**AT+CLIP?**		**+CLIP:0,x** **OK**	
12	Read current value of cellular result codes	**AT+CRC?**		**+CRC:0** **OK**	
13	Read current value of displaying mobile equipment errors	**AT+CMEE?**		**+CMEE:1** **OK**	

6.1.4 Command echo (ATE)

Purpose: This test is to show that the EDOR can enable / disable command echo.

Precondition: ETCS data only radio test configuration.

References:

EIRENE SRS : 16.3.4

EURORADIO : § 4.4.3.1, 4.4.8.1.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipmentTE1	**EDOR**	Terminal equipmentTE1
1	Set the command echo to *disable*	**ATE**		**OK**	
2	Test command echo	**AT**		**OK**	
3	Set the command echo to *enable*	**ATE1**		**OK**	
4	Test command echo	**AT**		**AT** **OK**	
5	Test command echo with wrong value	**ATE2**		**ERROR**	

6.1.5   Reset device to default configuration (ATZ)

Purpose: This test is to show that the EDOR can be reset by loading the default profile.

Precondition: ETCS data only radio test configuration.

References:
EIRENE SRS :   16.3.4

EURORADIO :   § 4.4.9.1.1, 4.4.9.2.3

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipmentTE1	**EDOR**	Terminal equipmentTE1
1	Set automatic call answering to *enable with value 2*	**ATS0=2**		**OK**	
2	Read current value of automatic call answering	**ATS0?**		**002** **OK**	
3	Save current configuration to default	**AT&W0**		**OK**	
4	Read current value of automatic call answering	**ATS0?**		**002** **OK**	
5	Set automatic call answering to *enable with value 10*	**ATS0=10**		**OK**	
6	Read current value of automatic call answering	**ATS0?**		**010** **OK**	
7	Reset device to default configuration	**ATZ0**		**OK**	
8	Read current value of automatic call answering	**ATS0?**		**002** **OK**	

6.1.6 Set to factory-defined configuration (AT&F)

Purpose: This test is to show that the EDOR can set it's configuration to factory default.

Precondition: ETCS data only radio test configuration.

References:
EIRENE SRS :   16.3.4

EURORADIO :   § 4.4.3.2; 4.4.9.2.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipmentTE1	**EDOR**	Terminal equipmentTE1
1	Set automatic call answering to *enable with value 5*	**ATS0=5**		**OK**	
2	Read current value of automatic call answering	**ATS0?**		**005** **OK**	
3	Set new value of serial line speed (change baud rate setting of TE to 4800)	**AT+IPR=4800**		**OK**	
4	Read current value of serial line speed	**AT+IPR?**		**+IPR: 4800**	
5	Set to factory-defined configuration (change baud rate setting of TE to 9600)	**AT&F0**		**OK**	
6	Read default value of serial line speed	**AT+IPR?**		**+IPR: 9600**	
7	Read current value of automatic call answering	**ATS0?**		**001** **OK**	

6.1.7 Phone activity status (+CPAS)

Purpose: This test is to show that the EDOR can read the phone activity status.

Precondition: ETCS data only radio test configuration.

References:
EIRENE SRS : 16.3.4

EURORADIO : § 4.4.11.1.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	Terminal equipmentTE1	**EDOR**	Terminal equipmentTE1
1	Test possible values for phone activity status	**AT+CPAS=?**		**+CPAS:** \<list of supported statuses\> **OK**	
2	Read current phone activity status	**AT+CPAS**		**+CPAS: 0** **OK**	
3	Set automatic call answering to *disable*		ATS0=0		OK
4	Set the escape sequence to "+++"	**ATS2=43**		**OK**	
5	Select bearer service type	**AT+CBST=70,0,0**	AT+CBST=70,0,0		
6	Initiate data call to Terminal equipment	**ATD**\<MSISDN\>			RING
7	Accept incoming call		ATA	**CONNECT 4800**	CONNECT 4800
8	Switch from data to command mode	**+++**		**OK**	
9	Read current phone activity status	**AT+CPAS**		**+CPAS: 4** **OK**	
10	Switch from command to data mode	**ATO0**		**CONNECT 4800**	
11	Check if data transmission in both directions possible				
12	Switch from data to command mode	**+++**		**OK**	
13	Read current phone activity status	**AT+CPAS**		**+CPAS: 4** **OK**	
14	Terminate data call	**ATH**		**OK**	NO CARRIER
15	Read current phone activity status	**AT+CPAS**		**+CPAS: 0** **OK**	

6.1.8   Restricted SIM access (+CRSM)

Purpose: This test is to show that the EDOR can read from the EF GsmrPLMN of the SIM Card and create an ordered list comprising MCC/MNC and alphanumeric network names for all networks.

Precondition: ETCS data only radio test configuration.

References:
EIRENE SRS :   16.3.4
EURORADIO :   § 4.4.10.4.1

Test Procedure:

Step	Procedure		Result / Effect	
	Description	EDOR	EDOR	
1	Read 15 octets to get status of EF 28661=0x6FF5=GSMR[1]	**AT+CRSM=192,28661,0,0,15**	**+CRSM: 144,0,"<info> "** **OK**	
2	Read record 1 from EF$_{GSMR}$ (home network)	**AT+CRSM=178,28661,1,4,9**	**+CRSM: 144,0,"<info> "** **OK**	
3	Read record 2 from EF$_{GSMR}$	**AT+CRSM=178,28661,2,4,9**	**+CRSM: 144,0,"<info>"** **OK**	

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[1] Returned file length=0x13B=315 octets length of records=9 thus 35 records

6.2 Circuit Switched Mode

6.2.1 Dialling calls (ATD)

Purpose: This test is to show that the EDOR can initiate calls with different eMLPP priorities.

Precondition: EDOR test configuration.

References:

EIRENE FRS : § 10.2.1, 10.2.2, 16.2.1.3; 16.2.3.1

EIRENE SRS : § 4.3.3; 16.3.2

EURORADIO : § 2.1.1.3, 2.1.2.1, 2.1.2.2, 2.3.1, 4.4.5.1.1, 4.4.5.2.1, 4.4.5.2.2, 4.4.5.2.3, 4.4.5.3.1, 4.4.5.3.3

ETSI : EN 122 067, EN 300 904, EN 300 924, EN 300 940, TS 100 549; TS 100 625, TS 100 932, TS 123 090; TS 124 008

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	TE1
1	Set automatic call answering to *disable*		ATS0=0		OK
2	Set the escape sequence to "+++"	**ATS2=43**		**OK**	
3	Select bearer service type	**AT+CBST=70,0,0**	AT+CBST=70,0,0	**OK**	OK
4a	Initiate data call to Terminal equipment with default eMLPP	**ATD*75#** <MSISDN>			RING
4b	Initiate data call to Terminal equipment with eMLPP <0>	**ATD*750#** <MSISDN>			RING
4c	Initiate data call to Terminal equipment with eMLPP <1>	**ATD*751#** <MSISDN>			RING
4d	Initiate data call to Terminal equipment with eMLPP <2>	**ATD*752#** <MSISDN>			RING
4e	Initiate data call to Terminal equipment with eMLPP <3>	**ATD*753#** <MSISDN>			RING
4f	Initiate data call to Terminal equipment with eMLPP <4>	**ATD*754#** <MSISDN>			RING
5	Accept incoming call		ATA	**CONNECT 4800**	CONNECT 4800
6	Switch from data to command mode	**+++**		**OK**	
7	Terminate data call	**ATH**		**OK**	NO CARRIER

Note: eMLPP default value is defined at network side in HLR/VLR

6.2.2 Terminating calls (ATH)

Purpose: This test is to show that the EDOR can terminate calls.

Precondition: EDOR test configuration.

References:
EIRENE FRS :   § 16.2.1.3; 16.2.3.1
EURORADIO :   § 4.4.7.1
ETSI :   TS 124 080

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	TE1
1	Set automatic call answering to *disable*		ATS0=0		OK
2	Set the escape sequence to "+++"	**ATS2=43**		**OK**	
3	Select bearer service type	**AT+CBST=70,0,0**	AT+CBST=70,0,0	**OK**	OK
4	Initiate data call to Terminal equipment	**ATD<MSISDN>**			
5	Accept incoming call		ATA	**CONNECT 4800**	CONNECT 4800
6	Switch from data to command mode	**+++**		**OK**	
7	Terminate data call	**ATH**		**OK**	NO CARRIER

6.2.3 Deleted

6.2.4 Subscriber number (+CNUM)

Purpose: This test is to show that the EDOR can read out the MSISDNs for available services from the SIM card.

Precondition: EDOR test configuration.

References:
EIRENE SRS : § 9.7.1, 9.7.4, 16.2.4
EURORADIO : § 4.4.10.1.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	TE1
1	Read MSISDN from the SIM card	**AT+CNUM**		**+CNUM: ”**info text**”,** **”MSISDN”** **OK**	

6.2.5 Network registration (+CREG)

Purpose: This test is to show that the EDOR can show the registration status of the device.

Precondition: EDOR test configuration.

References:
EIRENE FRS : § 16.2.1.3, 16.3.4
EURORADIO : § 4.4.10.2.1, 4.4.10.2.2.3, C.1.1
ETSI : EN 301 515

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	TE1
1	Enable network registration unsolicited result code	**AT+CREG=1**		**OK**	
2	Test possible values for network registration	**AT+CREG=?**		**+CREG: <list of supported unsolicited result codes >** **OK**	
3	Read current value of network registration	**AT+CREG?**		**+CREG: 1,1** **OK**	
4	Interrupt network coverage for EDOR			**+CREG: 0** **or** **+CREG: 2**	
5	Restore network coverage for EDOR			**+CREG: 1**	
6	Read current value of network registration	**AT+CREG?**		**+CREG: 1,1** **OK**	

6.2.6 Operator selection (+COPS)

Purpose: This test is to show that the EDOR can register to different GSM network operators.

The EDOR shall give preference to the GSM-R frequency band.

Precondition: EDOR test configuration.

References:
EIRENE FRS : § 16.2.1.3, 16.2.2.1,
EIRENE SRS : 10.5.1i
EURORADIO : § 4.4.1, 4.4.10.3.1, 4.4.10.3.4; 4.4.10.3.5; 4.4.13.1; C.1.1

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	T1
1	Set the error result code to *enable and use numeric values*	**AT+CMEE=1**		**OK**	
2	Test possible values for operator selection	**AT+COPS=?**		**+COPS:** <list of supported operators> **OK**	
3	Set operator selection mode to *automatic*	**AT+COPS=0**		**OK +CREG:1 or +CREG:5 (if network is roaming)**	
4	Read current value of operator selection	**AT+COPS?**		**+COPS: 0,<format>, <oper> OK**	
5	Deregister from current network	**AT+COPS=2**		**OK +CREG:0**	
6	Set invalid value for operator selection	**AT+COPS=5**		**+CME ERROR: <err>**	
7	Manual registration to an available network operator <oper>	**AT+COPS=1,2,<oper>**		**OK +CREG:1**	

6.2.7 Data call – transparent 4800 bps (V.110)

Purpose: This test is to show that the EDOR can initiate a transparent data call with 4800 bit/s.

Precondition: EDOR test configuration.

References:
EIRENE FRS : § 4.2.2; 16.2.1.3; 16.2.3.1
EIRENE SRS : § 4.1.3.7, 4.3.2; 16.3.2
EURORADIO : § 2.1.1.1, 2.1.2.1, 4.4.5.2.3
ETSI :   EN 300 904, EN 300 918

Test Procedure:

Step	Procedure			Result / Effect	
	Description	**EDOR**	TE1	**EDOR**	TE1
1	Set automatic call answering to *disable*		ATS0=0		OK
2	Set the escape sequence to "+++"	**ATS2=43**		**OK**	
3	Select bearer service type	**AT+CBST=70,0,0**	AT+CBST=70,0,0	**OK**	OK
4	Set the DTE serial link baud rate*	**AT+IPR=4800**	AT+IPR=4800	**OK**	OK
5	Read current used baud rate	**AT+IPR?**	AT+IPR?	**+IPR: 4800** **OK**	+IPR: 4800 OK
6	Initiate data call to Terminal equipment	**ATD**<MSISDN>			RING
7	Accept incoming call		ATA	**CONNECT 4800**	CONNECT 4800
8	Check if data transmission in both directions possible				
9	Switch from data to command mode	**+++**		**OK**	
10	Terminate data call	**ATH**		**OK**	NO CARRIER

* Set the PC com-port to the same baud rate

6.2.8 Deleted

6.2.9 Handling of multiple ETCS connections (CS mode)

Purpose: This test is to show that the ETCS data only radio is capable of handling at least two ETCS connections that are simultaneously active. These connections are established in CS mode.

Precondition: ETCS data only radio test configuration.

References:
EIRENE FRS : § 16.2.1.3; 16.2.3.1
EIRENE SRS : § 16.3.2; 16.3.3

Test Procedure:

Step	Description	Command		Response / Effect	
		EDOR (MS 1)	**EDOR (MS 2)**	**EDOR (MS 1)**	**EDOR (MS 2)**
1	Set automatic call answering to disable	ATS0=0		OK	
2	Set the escape sequence to "+++"	ATS2=43		OK	
3	Select bearer service type	AT+CBST=70,0,0		OK	
4	Set the DTE serial link baud rate	AT+IPR=9600		OK	
5	Read current used baud rate	AT+IPR?		+IPR: 9600 OK	
6	Initiate data call to Terminal equipment	ATD<MSISDN_1>		OK	
7	Wait for accepting the incoming call			CONNECT 4800	
8	Check if data transmission in both directions possible (for MS-1)				
9	Set automatic call answering to disable		ATS0=0		OK
10	Set the escape sequence to "+++"		ATS2=43		OK
11	Select bearer service type		AT+CBST=70,0,0		OK
12	Set the DTE serial link baud rate		AT+IPR=9600		OK
13	Read current used baud rate		AT+IPR?		+IPR: 9600 OK
14	Initiate data call to Terminal equipment		ATD<MSISDN_2>		OK
15	Wait for accepting the incoming call				CONNECT 4800

16	Check if data transmission in both directions possible (for MS-2)				
17	Switch from data to command mode	+++	+++	OK	OK
18	Terminate data call	ATH	ATH	OK	OK

6.3 Packet Switched Mode

6.3.1 Quality of Service Profile - Requested for ETCS application (+CGEQREQ)

Purpose: This test is to show that the ETCS data only radio supports the QoS parameter settings for ETCS including IPv4 addressing scheme.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS : § 4.1.3.7; 9.13.4; 9.15.4; 9.15.5; 10.8.5.2; 16.3.3iii; 16.3.3vii
EURORADIO : § 2.1.3.5; 2.1.3.8; 2.1.3.8i; 2.1.3.8ii; 4.6.4.1; 4.6.4.9; 4.6.2.2; 4.6.2.4; 4.6.2.6

QoS profile "ETCS application":

GPRS/EGPRS Radio Access Bearer QoS parameter	Parameter settings
Traffic class	1 (Streaming)
Maximum bitrate UL [kbps]	64
Maximum bitrate DL [kbps]	64
Guaranteed bitrate UL [kbps]	4 (*Chosen GBR value is according to the common ETCS traffic model.*)
Guaranteed bitrate DL [kbps]	4 (*Chosen GBR value is according to the common ETCS traffic model.*)
Delivery order	0 (No)
Maximum SDU size [octets]	1500
SDU error ratio	Assigned on national basis
Residual bit error ratio	1E5 (10^{-5})
Delivery of erroneous SDUs	0 (No)
Transfer delay [ms]	N/A
Traffic Handling Priority	1

Test Procedure:

Step	Description	Command	Response/Effect
1	Return the current Packet Domain service state	AT+CGATT?	OK +CGATT: 0
2	Attach to GPRS network	AT+CGATT=1	OK
3	Requesting values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.	AT+CGEQREQ=?	OK +CGEQREQ: <PDP_type>, (list of supported <Traffic class>s) ,(list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s) ,(list of supported <Maximum SDU size>s) ,(list of supported <SDU error ratio>s) ,(list of supported <Residual bit error ratio>s) ,(list of supported <Delivery of erroneous SDUs>s) ,(list of supported <Transfer delay>s) ,(list of supported <Traffic handling priority>s)
4	Define the PDP context 1 with PDP type "IP" and APN (e.g.:"etcs.mnc228.mcc006.gprs ")[2].	AT+CGDCONT=1,"IP","etcs.mnc228.mcc006.gprs",”0”,0,0	OK
5	Specify a quality of service profile for the PDP context 1	AT+CGEQREQ = 1,1,64,64,4,4,0,1500,,”1E5”,0,,1	OK
6	Requesting the current settings for each defined context.	AT+CGEQREQ?	OK +CGEQREQ: 1,1,64,64,4,4,0,1500,”0E0”,”1E5”,0,0,1
7	PDP context 1 activation	AT+CGACT=1,1	OK

---

[2] According to APN structure described in 0

6.3.2 Quality of Service Profile - Requested for non-ETCS application (+CGEQREQ)

Purpose: This test is to show that the ETCS data only radio supports the QoS parameter settings for Non-ETCS applications.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References: § 4.1.3.7; 9.13.10; 9.15.4; 9.15.5; 10.8.5.1; 16.3.3iii
EIRENE SRS :   § 4.6.4.1; 4.6.4.9
EURORADIO :

QoS profile "Non-ETCS application":

GPRS/EGPRS Radio Access Bearer QoS parameter	Parameter settings
Traffic class	2 (interactive) or 3 (background)
Maximum bitrate UL [kbps]	Assigned on national basis
Maximum bitrate DL [kbps]	Assigned on national basis
Guaranteed bitrate UL [kbps]	N/A
Guaranteed bitrate DL [kbps]	N/A
Delivery order	0 (No)
Maximum SDU size [octets]	1500
SDU error ratio	Assigned on national basis
Residual bit error ratio	Assigned on national basis
Delivery of erroneous SDUs	Assigned on national basis
Transfer delay [ms]	N/A
Traffic Handling Priority	2 or 3 (only applicable for interactive traffic class)

Test Procedure:

Step	Description	Command	Response/Effect
1	Return the current Packet Domain service state	AT+CGATT?	OK +CGATT: 0
2	Attach to GPRS network	AT+CGATT=1	OK
3	Requesting values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.	AT+CGEQREQ=?	OK +CGEQREQ: <PDP_type>, (list of supported <Traffic class>s) ,(list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s) ,(list of supported <Maximum SDU size>s) ,(list of supported <SDU error ratio>s) ,(list of supported <Residual bit error ratio>s) ,(list of supported <Delivery of erroneous SDUs>s) ,(list of supported <Transfer delay>s) ,(list of supported <Traffic handling priority>s)
4	Define the PDP context 1 with PDP type "IP" and APN (e.g.:"kms.mnc228.mcc006.g prs ")[3].	AT+CGDCONT=1,"IP","kms.mnc228.mcc006.gprs",”0”,0,0	OK
5	Specify a quality of service profile for the PDP context 1	AT+CGEQREQ= 1,2,,,,,0,1500,,,,,2	OK
6	Requesting the current settings for each defined context.	AT+CGEQREQ?	OK +CGEQREQ: 1,2,0,0,0,0,,1500,,,,,2
7	PDP context 1 activation	AT+CGACT=1,1	OK
8	Check if profile for the active PDP context 1 is used in the Activate PDP Context Request message is send to the network.		

---

[3] According to APN structure described in 0

6.3.3 Packet data protocol parameters for ETCS application (+CGDCONT)

Purpose: This test is to show that the ETCS data only radio is capable to specify PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

The APN structure to be used for the dedicated operation of ETCS in PS-mode shall be of the format {<network id>.<operator id>.gprs} where:

     network id = "etcs"
     operator id = "mncXXX.mccYYY.gprs" whereas

          XXX = MNC - Mobile Network Code 3digits*
          YYY = MCC - Mobile Country Code 3digits

* MNC can have 2 or 3 digits. In case of 2 digits MNC the format used in the APN operator id shall be 0XX.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS : § 9.13.3; 9.13.4; 16.3.3iii
EURORADIO : § 2.1.3.10; 2.1.4.1; 4.6.3.8; 4.6.3.9

Test Procedure:

Step	Description	Command	Response/Effect
1	Return the current Packet Domain service state	AT+CGATT?	OK +CGATT: 0
2	Attach to GPRS network	AT+CGATT=1	OK
3	Returns supported values as a compound value	AT+CGDCONT=?	OK +CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,…[,(list of supported <pdN>s)]]] [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)
4			as <PDP_type> IPv4 for PPP shall be supported
5	Enable extended error response	AT+CMEE=2	OK
6	Define the PDP context 6 which is not supported.	AT+CGDCONT=6,"IP","etcs. mnc228.mcc006.gprs",,"0",0,0	+CMEE: ERROR
7	Define the PDP context 1 with PDP type "IP" and APN (e.g.:"etcs.mnc228.mcc006.gprs ").	AT+CGDCONT=1,"IP","etcs. mnc228.mcc006.gprs" ,"0",0,0	OK

Step	Description	Command	Response/Effect
8	Read the current settings for each defined context	AT+CGDCONT?	OK +CGDCONT: 1,"IP","etcs.mnc228.mcc006.gprs" ,"0.0.0.0",0,0
9	Activate the PDP context 1	AT+CGACT=1,1	OK

6.3.4 Packet data protocol parameters for non-ETCS application (+CGDCONT)

Purpose: This test is to show that the ETCS data only radio is capable to specify PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

      The APN structure to be used for the dedicated operation of the online key management in PS-mode shall be of the format {<network id>.<operator id>.gprs} where:

         network id = "kms
         operator id = "mncXXX.mccYYY.gprs" whereas

            XXX = MNC - Mobile Network Code 3digits*
            YYY = MCC - Mobile Country Code 3digits

      * MNC can have 2 or 3 digits. In case of 2 digits MNC the format used in the APN operator id shall be 0XX.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS : § 9.13.9; 9.13.10; 16.3.3iii
EURORADIO : § 2.1.4.1; 4.6.3.8

Test Procedure:

Step	Description	Command	Response/Effect
1	Return the current Packet Domain service state	AT+CGATT?	OK +CGATT: 0
2	Attach to GPRS network	AT+CGATT=1	OK
3	Returns supported values as a compound value	AT+CGDCONT=?	OK +CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,…[,(list of supported <pdN>s)]]] [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)
4			as <PDP_type> IPv4 for PPP shall be supported
5	Enable extended error response	AT+CMEE=2	OK
6	Define the PDP context 1 with PDP type "IP" and APN (e.g.: "kms.mnc228.mcc006.gprs ").	AT+CGDCONT=1,"IP","kms.mnc228.mcc006.gprs",”0”,0,0	OK

Step	Description	Command	Response/Effect
7	Read the current settings for each defined context	AT+CGDCONT?	OK +CGDCONT: 1,"IP","kms.mnc228.mcc006.gprs" ,"0.0.0.0",0,0
8	Activate the PDP context 1	AT+CGACT=1,1	OK

6.3.5   Supported Coding Schemes

Purpose: This test is to show that the ETCS data only radio comprises the support of GPRS and
                        EGPRS bearer services including all available (Modulation) Coding Schemes.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS :   § 4.3.2; 16.3.3i

Test Procedure:

Step	Description	Command	Response/Effect
1	Attach to GPRS network	AT+CGATT=1	OK
2			+CGREG: 1
3	Check ABIS Trace for GMM ATTACH REQUEST message: **1 -> 8 PSK Power Capability present** Mobile is capable of EGPRS		

6.3.6   GPRS mobile station class (+CGCLASS)

Purpose: This test is to show that the ETCS data only radio is able to operate considering Mobile Class B.

Precondition: ETCS data only radio test configuration. After power on the class mode of operation shall not be set explicitly to any value before the test. EDOR is not attached to a GPRS network.

References:
EIRENE SRS :   § 16.3.3ii
EURORADIO :   § 2.1.3.3; 4.6.1.1, 4.6.1.2

Test Procedure:

Step	Description	Command	Response/Effect
1	List of supported classes	AT+CGCLASS=?	OK +CGCLASS: (list of supported \<classes\>)
2	Requesting default information on the supported MT mode of operation	AT+CGCLASS?	OK +CGCLASS:"B"[45]
3	Test if requested mode is not supported	AT+CGCLASS="F"	ERROR
4	Attach to PS domain	AT+CGATT=1	OK
5	Get current status of GPRS network registration	AT+CGATT?	+CGATT: 1 OK
6	Set mode to "CC" (CC means that the MT would only operate CS services)	AT+CGCLASS="CC"	OK (a PS detach shall be performed by the MT)
7	Get current status of GPRS network registration	AT+CGATT?	+CGATT: 0 OK

---

[4] „B" means that the MT would operate PS and CS services but not simultaneously
[5] in case MT is not registered to GPRS network, value "CC" is also acceptable

6.3.7 Handling of multiple ETCS connections (CS/PS mode)

Purpose: This test is to show that the ETCS data only radio is capable of handling at least two ETCS connections that are simultaneously active. These connections are established in CS and PS mode.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS :   § 16.3.2; 16.3.3
EURORADIO :   § 4.6.4.1

Test Procedure:

Step	Description	Command EDOR (MS 1)	Command EDOR (MS 2)	Response / Effect EDOR (MS 1)	Response / Effect EDOR (MS 2)
1	Return the current Packet Domain service state	AT+CGATT?		OK +CGATT: 0	
2	Attach to GPRS network	AT+CGATT=1		OK	
3	Define the PDP context 1 with PDP type "IP" and APN (e.g.: "etcs.mnc228.mcc006.gprs ").	AT+CGDCONT=1,"IP","etcs.mnc228.mcc006.gprs",”0”,0,0		OK	
4	Specify a quality of service profile for the PDP context 1	AT+CGEQREQ = 1,1,64,64,4,4,0,1500,,”1E5”,0,,1		OK	
5	Activate the PDP context 1	AT+CGACT=1,1		OK	
6	Enables the communication between the TE and the network	AT+CGDATA=”PPP”,1		OK	
7	Set automatic call answering to disable		ATS0=0		OK
8	Set the escape sequence to “+++”		ATS2=43		OK
9	Select bearer service type		AT+CBST=70,0,0		OK
10	Set the DTE serial link baud rate		AT+IPR=9600		OK
11	Read current used baud rate		AT+IPR?		+IPR: 9600 OK
12	Initiate data call to Terminal equipment		ATD<MSISDN>		OK

Step	Description	Command		Response / Effect	
		EDOR (MS 1)	**EDOR (MS 2)**	**EDOR (MS 1)**	**EDOR (MS 2)**
13	Wait for accepting the incoming call				CONNECT 4800
14	Check if data transmission in both directions possible				
15	Check if packet data transmission in both directions is possible				
16	Switch from data to command mode		+++		OK
17	Terminate data call		ATH		OK
18	Deactivate the PDP context 1	AT+CGACT=0,1		OK	

6.3.8 Handling of multiple ETCS connections (PS mode)

Purpose: This test is to show that the ETCS data only radio is capable of handling at least two ETCS connections that are simultaneously active. These connections are established in PS mode.

Precondition: ETCS data only radio test configuration. EDOR is not attached to a GPRS network.

References:
EIRENE SRS : § 16.3.2; 16.3.3
EURORADIO : § 2.1.3.23; 4.6.4.1

Test Procedure:

Step	Description	Command EDOR (MS 1)	Command EDOR (MS 2)	Response / Effect EDOR (MS 1)	Response / Effect EDOR (MS 2)
1	Return the current Packet Domain service state	AT+CGATT?		OK +CGATT: 0	
2	Attach to GPRS network	AT+CGATT=1		OK	
3	Define the PDP context 1 with PDP type "IP" and APN (e.g.:"etcs.mnc228.mcc006.gprs ").	AT+CGDCONT=1,"IP","etcs.mnc228.mcc006.gprs",”0”,0,0		OK	
4	Specify a quality of service profile for the PDP context 1	AT+CGEQREQ = 1,1,64,64,4,4,0,1500,,”1E5”,0,,1		OK	
5	Activate the PDP context 1	AT+CGACT=1,1		OK	
6	Enables the communication between the TE and the network	AT+CGDATA=”PPP”,1		OK	
7	Return the current Packet Domain service state		AT+CGATT?		OK +CGATT: 0
8	Attach to GPRS network		AT+CGATT=1		OK
9	Define the PDP context 1 with PDP type "IP" and APN (e.g.:"etcs.mnc228.mcc006.gprs ").		AT+CGDCONT=1,"IP","kms.mnc228.mcc006.gprs",”0”,0,0		OK
10	Specify a quality of service profile for the PDP context 1		AT+CGEQREQ = 1,1,64,64,4,4,0,1500,,”1E5”,0,,1		OK
11	Activate the PDP context 1		AT+CGACT=1,1		OK

Step	Description	Command		Response / Effect	
		EDOR (MS 1)	**EDOR (MS 2)**	**EDOR (MS 1)**	**EDOR (MS 2)**
12	Enables the communication between the TE and the network		AT+CGDATA="PPP",1		OK
13		Check if packet data transmission in both directions is possible			
14	Deactivate the PDP context 1	AT+CGACT=0,1		OK	
15	Deactivate the PDP context 2		AT+CGACT=0,1		OK