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## Foreword

This Technical Basis for Regulation (TBR) has been produced by the Special Mobile Group (SMG) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This TBR covers the attachment requirements for terminal equipment for the Global System for Mobile communications (GSM) telephony.

This TBR 9 second edition, has been produced as a result of further work carried out by TC-SMG.

This TBR contains the procedures and requirements for the approval testing of GSM equipment supporting telephony.

The requirements of other TBRs apply in addition to this TBR.

For each test, *SUPPLEMENTARY INFORMATION* is provided, giving a justification why this item has been selected for regulatory testing, and a reference to the relevant article of the Terminal Directive [1].

This TBR is based on GSM 11.10 (I-ETS 300 020-1) [2].

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## 1 Scope

This Technical Basis for Regulation (TBR) specifies the technical requirements to be provided by terminal equipment capable of connection to a public telecommunications network. These requirements apply to terminals for phase 1 of the public land mobile radio service utilising constant envelope modulation, operating in the 900 MHz band with a channel separation of 200 kHz, and carrying 8 full rate traffic channels per carrier according to the Time Division Multiple Access (TDMA) principle.

This TBR covers the requirements for GSM Telephony (speech).

NOTE: Certain access aspects are part of TBR 5 [7].

For each conformance requirement, one or more test purposes are given. For each test purpose, a single reference is given to the test method in GSM 11.10 (I-ETS 300 020-1) [2]. The requirements apply to speech transmission.

The measurement uncertainty is handled, as described in GSM 11.10 (I-ETS 300 020-1) [2].

This TBR covers the essential requirements of the Terminal Directive 91/263/EEC [1] Article 4g. Articles 4d, 4e and 4f are covered by TBR 5 [7].

The Terminal Directive 91/263/EEC [1] Articles 4a and 4b are covered by other directives, and, therefore, not by this TBR.

In this TBR, there are no EMC technical requirements in terms of the Terminal Directive 91/263/EEC [1], Article 4c.

NOTE: Technical Requirements for EMC performance and testing of the equipment are covered by the relevant standards applicable to the EMC Directive 89/336/EEC, Annex A.

Terminal equipment may be subject to additional requirements in other Common Technical Regulations (CTR) depending on the equipments' functionality.

GSM 11.10 (I-ETS 300 020-1) [2] constitutes the full conformance test suite for GSM. The verification of the conformance requirements in this TBR are based on the tests described in this reference. The set of requirements in GSM 11.10 (I-ETS 300 020-1) [2] and the set of requirements in this TBR need not be identical.

## 2 Normative references

This TBR incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revision of any of these publications apply to the requirements specified in this TBR, only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] Terminal Directive 91/263/EEC: "Council directive of 29 April 1991 on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity. ("The Terminal Directive")".
- [2] GSM 11.10 (I-ETS 300 020-1): "European digital cellular telecommunications system (phase 1); Mobile station conformity specifications".
- [3] CCITT Recommendation X.290 (1991): "Open Systems Interconnection - Conformance Testing Methodology and Framework, General Concepts".
- [4] CCITT Recommendation X.291 (1991): "Open Systems Interconnection - Conformance Testing Methodology and Framework, Abstract Test Suite Specification".

- [5] CCITT Recommendation X.294 (1991): "Open Systems Interconnection - Conformance Testing Methodology and Framework, Requirements on Test Laboratories and Clients for the Conformance Assessment Process".
- [6] ETS 300 085 (1990): "Integrated Services Digital Network (ISDN); 3,1 kHz telephony teleservice attachment requirements for handset terminals".
- [7] prTBR 5: "European digital cellular telecommunications system; Attachment requirements for Global System for Mobile communications (GSM) mobile stations; Mobile Services".

### **3 Information from the client to the test laboratory**

The applicability of the individual tests in this TBR is dependent on the type of equipment submitted for approval.

The information required to be supplied from the client to the test laboratory appears in Annex 3 of GSM 11.10 (I-ETS 300 020-1) [2].

NOTE: The terms PICS and PIXIT in GSM 11.10 (I-ETS 300 020-1) [2] are not the same as the corresponding terms in CCITT Recommendation X.290 [3] and CCITT Recommendation X.291 [4].

### **4 Other requirements to GSM mobile stations**

Some special test functions in GSM 11.10 (I-ETS 300 020-1) [2] shall be implemented by the manufacturer.

### **5 Structure of TBR**

Test group objective (where applicable): gives a narration of the common objective for a group of closely related test cases.

Test purpose (single or multiple): describes the purpose for performing a particular test i.e. which behaviour, action, etc. is to be tested.

Test case references (procedures in GSM 11.10 (I-ETS 300 020-1) [2]): points to the detailed test method and procedure in GSM 11.10 (I-ETS 300 020-1) [2] to be used for the test.

Conformance requirement: describes the requirements to be met in the test.

Requirement reference (from the core specifications); identifies the GSM core specification(s) accommodating the requirement(s) for these test results. The identification is as accurate as possible, basically down to a logical unit of the given specification (chapter, section, subsection, etc.) determined on a per case basis.



## 6 References to GSM core specifications

This TBR incorporates by versioned references provisions from other GSM specifications. These specifications should be considered when using this TBR.

NOTE: This GSM specification list is applicable to all GSM phase 1 related TBRs and therefore may contain more specifications than actually referred to in this TBR.

<u>Number</u>	<u>Version</u>	<u>Title</u>
GSM		
02.02	3.2.0	Bearer Services Supported by a GSM PLMN
02.03	3.4.0	Teleservices Supported by a GSM PLMN
02.04	3.7.1	Description of Supplementary Services
02.06	3.2.0	Types of Mobile Stations
02.07	3.4.1	Mobile Station Features
02.09	3.1.0	Security Aspects
02.11	3.7.0	Service Accessibility
02.16	3.0.1	International MS Equipment Identities
02.17	3.2.0	Subscriber Identity Modules, Functional Characteristics
02.30	3.9.0	Man-machine Interface of the Mobile Station
02.40	3.2.0	Procedures for Call Progress Indications
02.82	3.6.1	Call Offering Supplementary Services
02.88	3.6.1	Call Restriction Supplementary Services
03.03	3.6.0	Numbering, Addressing and Identification
03.05	3.2.0	Technical performance objectives
03.10	3.3.0	GSM PLMN Connection Types
03.13	3.0.2	Discontinuous Reception (DRX) in the GSM System
03.14	3.0.2	Support of DTMF via the GSM System
03.20	3.3.2	Security-related Network Functions
03.40	3.7.0	Technical Realization Short Message Service Point-to-point
03.41	3.4.0	Technical Realization of Short Message Service Cell Broadcast
03.43	3.0.1	Technical Realization of Videotex
03.44	3.0.1	Support of Teletex in a GSM PLMN
03.45	3.3.0	Technical Realization of Facsimile Group 3 Service - transparent
03.46	3.2.1	Technical Realization of Facsimile Group 3 Service - non transparent
03.50	3.4.0	Transmission Planning Aspects of the Speech Service in the GSM PLMN System
04.01	3.0.1	MS-BSS Interface - General Aspects and Principles
04.02	3.0.2	GSM PLMN Access Reference Configuration
04.03	3.0.3	MS-BSS Interface : Channel Structures and Access Capabilities
04.04	3.3.4	MS-BSS Layer 1 - General Requirements
04.05	3.1.5	MS-BSS Data Link Layer - General Aspects
04.06	3.9.0	MS-BSS Data Link Layer Specification
04.07	3.3.3	Mobile Radio Interface Signalling Layer 3 -General Aspects
04.08	3.13.0	Mobile Radio Interface - Layer 3 Specification
04.10	3.2.3	Mobile Radio Interface Layer 3 -Supplementary Services Specification -General Aspects
04.11	3.3.0	Point-to-point Short Message Service Support on Mobile Radio Interface
04.12	3.2.1	Cell Broadcast Short Message Service Support on Mobile Radio Interface
04.21	3.4.0	Rate Adaptation on MS-BSS Interface
04.22	3.7.0	Radio Link Protocol for Data and Telematic Services on the MS-BSS Interface
04.80	3.2.0	Mobile Radio Interface Layer 3 - SS Specification - Formats and Coding
04.82	3.1.3	Mobile Radio Interface Layer 3 - Call Offering SS Specification
04.88	3.1.3	Mobile Radio Interface Layer 3 - Call Restriction SS Specification
05.01	3.3.2	Physical Layer on the Radio Path (General Description)
05.02	3.6.1	Multiplexing and Multiple Access on the Radio Path
05.03	3.6.1	Channel Coding
05.04	3.1.2	Modulation
05.05	3.16.0	Radio Transmission and Reception
05.08	3.7.0	Radio Subsystem Link Control
05.10	3.5.1	Radio Subsystem Synchronization
06.01	3.0.0	Speech Processing Functions : General Description

06.10	3.2.0	GSM Full Rate Speech Transcoding
06.11	3.0.1	Substitution and Muting of Lost Frames for Full-rate Speech Traffic Channels
06.12	3.0.1	Comfort Noise Aspects for Full Rate Speech Traffic Channels
06.31	3.1.0	Discontinuous Transmission (DTX) for Full Rate Speech Traffic Channels
06.32	3.0.0	Voice Activity Detection
07.01	3.14.0	General on Terminal Adaptation Functions for MSs
07.02	3.8.0	Terminal Adaptation Functions for Services Using Asynchronous Bearer Capabilities
07.03	3.4.0	Terminal Adaptation Functions for Services Using Synchronous Bearer Capabilities
09.02	3.10.0	Mobile Application Part Specification
11.11	3.15.0	Specification of the Internal Logical Organization of the SIM and its Interfaces
11.40	3.7.0	System Simulator Specification (MS conformance test system)

## 7 Abbreviations

For the purposes of this TBR the following abbreviations apply:

<u>Abbreviation</u>	<u>Full Term</u>
BFI	Bad Frame Indication
CC	Call Control
DAI	Digital Audio Interface
DISC	DISConnect frame
DTX	Discontinuous Transmission (mechanism)
ERP	Ear Reference Point
IMSI	International Mobile Subscriber Identity
MRP	Mouth Reference Point
MTC	Mobile Terminating Call
MS	GSM Mobile Station
PCM	Pulse Code Modulation
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation Extra Information for Testing
PLMN	Public Land Mobile Network
RF	Radio Frequency
SACCH	Slow Associated Control CHannel
SDCCH	Stand-alone Dedicated Control CHannel
SID	Silence Descriptor
SIM	Subscriber Identity Module
SS	System Simulator
TCH	Traffic CHannel
TCH/FS	Full rate Traffic CHannel for Speech
TDMA	Time Division Multiple Access
TMSI	Temporary Mobile Subscriber Identity
VAD	Voice Activity Detection

## 8 Receiver

Reference: GSM 05.05

### 8.1 Test 1

#### Test purpose:

To verify that the Bad Frame Indication (BFI) performance for reference sensitivity on a TCH/FS does not exceed the requirements.

#### Test case:

II.4.1.2/3

#### Conformance requirement:

On a full rate speech TCH (TCH/FS) with a random RF input, the overall reception performance shall be such that, on average, less than one undetected bad speech frame (false bad frame indication BFI) in 10 seconds will be measured.

#### Requirement reference:

GSM 05.05 6.4 b).

#### SUPPLEMENTARY INFORMATION:

##### *Test case justification:*

*More errors will degrade the speech channel and DTX functionality.*

##### *EC Terminal Directive reference:*

*Article 4g.*

## 9 Tests related to circuit switched call control

### 9.1 Circuit Switched Call Control state machine

#### 9.1.1 U3 MS originating Call Proceeding - 4th case

#### Test purpose:

To verify that a CC-entity of the MS in CC-state U3, "Mobile Originating Call Proceeding", upon receipt of a PROGRESS message indicating in-band announcement will through-connect the traffic channel for speech.

#### Test case:

II.5.3.8.1.2.2.4, trigger input: PROGRESS received with Progress indicator = 8.

#### Conformance requirement:

A CC-entity of the MS in CC-state U3, "Mobile Originating Call Proceeding", upon receipt of a PROGRESS message indicating in-band announcement will through-connect the traffic channel for speech.

**Requirement reference:**

TS GSM 04.08 section 3.4.3, TS GSM 04.08 section 5.1.3.

TS GSM 04.08 section 5.2.1.1.4, TS GSM 04.08 section 5.2.1.1.9.

TS GSM 04.08 section 5.5.1, TS GSM 04.08 section 11.3.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*This test case checks that the MS during establishment of an outgoing call is able to connect up the audio path when instructed to do so by the network whilst maintaining its call establishment state. If this procedure is incorrectly implemented, MS may perform untimely releases of call establishments and no network in-band information will be presented to the user.*

*EC Terminal Directive reference:*

Article 4g.

**9.2 Emergency call establishment**

**9.2.1 Emergency call establishment (idle updated)**

**Test purpose:**

To verify that after performance of the connect procedure, initiated by the user entering the number 112, a two way audio path is established.

**Test case:**

II.5.3.8.2.4.7, Procedure 4 (only the check on the two way audio path).

**Conformance requirement:**

After performance of the connect procedure, initiated by the user entering the number 112, a two way audio path shall be established.

**Requirement reference:**

TS GSM 04.08 section 5.2.1.2. TS GSM 02.30, section 4.4.2.2.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*The test case checks that speech is possible for an emergency call. If the procedure is incorrectly implemented in the MS, user requesting an emergency call might not be able to speak to the emergency centres.*

*EC Terminal Directive reference:*

Article 4g.

**9.2.2 Emergency call establishment (idle, no IMSI)**

**Test purpose:**

To verify that after the performance of the connect procedure, initiated by the user entering the number 112, even though the SIM is not in place, a two way audio path is established.

**Test case:**

II.5.3.8.2.6.7, Procedure 4 (only the checking of the two way audio path).

**Conformance requirement:**

After the performance of the connect procedure, initiated by the user entering the number 112, even though the SIM is not in place, a two way audio path shall be established.

**Requirement reference:**

TS GSM 04.08 section 5.2.1.2, TS GSM 02.30, section 4.4.2.2.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*This test case checks that speech is possible for an emergency call. If the procedure is incorrectly implemented in the MS, user requesting an emergency call might not be able to speak to the emergency centres.*

*EC Terminal Directive reference:*

*Article 4g.*

**9.3 Call Re-establishment**

**Test purpose:**

To verify that if call re-establishment is allowed, the MS having a CC entity in state U10, "active", will on detecting a radio link timeout and subsequently having completed the re-establishment of the radio connection, completes the two way audio path for speech.

**Test case:**

II.5.3.8.3.3.3, Requirements 4) - connect speech path in both directions.

**Conformance requirement:**

If call re-establishment is allowed, the MS having a CC entity in state U10, "active", shall on detecting a radio link timeout and subsequently having completed the re-establishment of the radio connection, complete the two way audio path for speech.

**Requirement reference:**

TS GSM 04.08 section 5.5.4.3.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*This test case checks that normal speech can continue after successful re-establishment of a radio link.*

*EC Terminal Directive reference:*

*Article 4g.*

## 10 Testing of structured procedures

### 10.1 MS originating call establishment, early assignment, release initiated by network (verification of audio path)

#### Test purpose:

- 1) To verify that the MS in "Idle, Updated" state with a TMSI assigned, when made to initiate a speech call, if it provides a human interface, displays the dialled number in the way described in a PICS/PIXIT statement.
- 2) To verify that after successful establishment of a mobile originating call which consists in:
  - the MS sending the CHANNEL REQUEST message;
  - the SS sending an IMMEDIATE ASSIGNMENT message allocating an SDCCH;
  - completion of establishment of the signalling link;
  - the MS sending a CM SERVICE REQUEST message;
  - performing authentication and cipher mode setting procedures;
  - the MS sending a SETUP message;
  - the SS sending a CALL PROCEEDING message;
  - the SS sending an ASSIGNMENT COMMAND message allocating an appropriate TCH;
  - the MS sending an ASSIGNMENT COMPLETE message;
  - the SS sending an ALERTING message and a CONNECT message;the MS through-connects the TCH for speech.

#### Test case:

TP1: II.5.3.9.2.2, Method of test, b) and c); II.5.3.9.2.3, Requirement 1).

TP2: II.5.3.9.2.3, Method of test, b),c),d),e),f),g),h),i),j),k); II.5.3.9.2.3, Requirement 8).

#### Conformance requirement:

- 1) An MS in "Idle, Updated" state with a TMSI assigned, when made to initiate a speech call, if it provides a human interface, shall display the dialled number in the way described in a PICS/PIXIT statement.
- 2) After successful establishment of a mobile originating call the MS shall through-connect the TCH for speech.

#### Requirement reference:

TP1: TS GSM 02.07.

TP2: TS GSM 04.08 sections 5.2.1.1.6 and 5.1.3.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

TP1: *If the displayed number is different from the dialled number, the user might be confused; he might disconnect and setup a new call, etc. The end-to-end service would be impacted.*

TP2: *If speech is not through-connected, the service is not available.*

*EC Terminal Directive reference:*

TP1: *Articles 4e and 4g.*

TP2: *Article 4g.*

**10.2 MS originating call establishment, early assignment, release initiated by network (verification of audio path)**

**Test purpose:**

- 1) Same as TP1 of 10.1.
- 2) To verify that after successful establishment of a mobile originating call which consists in:
  - the MS sending the CHANNEL REQUEST message;
  - the SS sending an IMMEDIATE ASSIGNMENT message allocating an SDCCH;
  - completion of establishment of the signalling link;
  - the MS sending a CM SERVICE REQUEST message;
  - performing authentication and cipher mode setting procedures;
  - the MS sending a SETUP message;
  - the SS sending a CALL PROCEEDING message;
  - the SS sending an ALERTING message;
  - the SS sending an ASSIGNMENT COMMAND message allocating an appropriate TCH;
  - the MS sending an ASSIGNMENT COMPLETE message;
  - the SS sending a CONNECT message;the MS through-connects the TCH for speech.

**Test case:**

TP1: II.5.3.9.3.2, Method of test, a); II.5.3.9.3.3, Requirement 1).

TP2: II.5.3.9.3.2, Method of test, b),c),d); II.5.3.9.3.3, Requirement 4).

**Conformance requirement:**

- 1) An MS in "Idle, Updated" state with a TMSI assigned, when made to initiate a speech call, if it provides a human interface, shall display the dialled number in the way described in a PICS/PIXIT statement.
- 2) After successful establishment of a mobile originating call the MS shall through-connect the TCH for speech.

**Requirement reference:**

TP1: TS GSM 02.07.

TP2: TS GSM 04.08 sections 5.2.1.1.6 and 5.1.3.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*TP1: If the displayed number is different from the dialled number, the user might be confused; (s)he might disconnect and setup a new call, etc. The end-to-end service would be impacted.*

*TP2: If speech is not through-connected, the service is not available.*

*EC Terminal Directive reference:*

*TP1: Articles 4e and 4g.*

*TP2: Article 4g.*

**10.3 MS terminating call establishment, early assignment, release initiated by MS (verification of audio path);**

**Test purpose:**

- 1) To verify that if after sending a CALL PROCEEDING message, the MS sends an ALERTING message during MTC establishment with early assignment, it generates an alerting indication.
- 2) To verify that the MS after receipt of a CONNECT ACKNOWLEDGE at a mobile terminating call, a TCH for speech having been successfully established, through-connects the two way audio path for speech.

**Test case:**

TP1: II.5.3.9.4.3, Requirement 7).

TP2: II.5.3.9.4.3, Requirement 10).

**Conformance requirement:**

- 1) If after sending a CALL PROCEEDING message, the MS sends an ALERTING message during MTC establishment with early assignment, it shall generate an alerting indication.
- 2) An MS after receipt of a CONNECT ACKNOWLEDGE at a mobile terminating call, a TCH for speech having been successfully established, shall through-connect the two way audio path for speech.

**Requirement reference:**

TP 1: TS GSM 04.08, section 5.2.2.3.2.

TP 2: TS GSM 04.08, section 5.2.2.6 and 5.1.3.



SUPPLEMENTARY INFORMATION:

*Test case justification:*

TP1: *If during alerting no indication is given to the user, (s)he has no chance to accept the call. The connection establishment was then useless.*

TP2: *This test case checks that speech is possible upon successful establishment of an incoming call.*

*EC Terminal Directive reference:*

*Articles 4g.*

**10.4 MS terminating call establishment, late assignment (verification of audio path)**

**Test purpose:**

- 1) To verify that if after sending a CALL PROCEEDING message, the MS sends an ALERTING message during MTC establishment with late assignment, it generates an alerting indication.
- 2) To verify that the MS after receipt of a CONNECT ACKNOWLEDGE at a mobile terminating call, a TCH for speech having been successfully established, through-connects the two way audio path for speech.

**Test case:**

TP1: II.5.3.9.5.3, Requirement 2).

TP2: II.5.3.9.5.3, Requirement 6).

**Conformance requirement:**

- 1) If after sending a CALL PROCEEDING message, the MS sends an ALERTING message during MTC establishment with late assignment, it shall generate an alerting indication.
- 2) An MS after receipt of a CONNECT ACKNOWLEDGE at a mobile terminating call, a TCH for speech having been successfully established, shall through-connects the two way audio path for speech.

**Requirement reference:**

TP 1: TS GSM 04.08, section 5.2.2.3.2.

TP 2: TS GSM 04.08, section 5.2.2.6 and 5.1.3.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

TP1: *If during alerting no indication is given to the user, (s)he has no chance to accept the call. The connection establishment was then useless.*

TP2: *This test case checks that speech is possible upon successful establishment of an incoming call.*

*EC Terminal Directive reference:*

*Articles 4g.*

**11 Speech teleservices**

**11.1 Test 1**

**Test purpose:**

To verify that the sending sensitivity frequency response from the MRP to the DAI is within the mask given in ETS 300 085 [6], subclause 6.2.1.1.

**Test case:**

II.11.1.1.

**Conformance requirement:**

The sending sensitivity frequency response shall be within the mask given in ETS 300 085 [6], subclause 6.2.1.1.

**Requirement reference:**

GSM 03.50 para. 3.8.1.1.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

**11.2 Test 2**

**Test purpose:**

To verify that the Sending Loudness Rating (SLR) is 8 +/- 3 dB.

**Test case:**

II.11.1.2.

**Conformance requirement:**

The Sending Loudness Rating (SLR) shall be 8 +/- 3 dB.

**Requirement reference:**

GSM 03.50 para. 3.1.1.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

**11.3 Test 3**

**Test purpose:**

To verify that the receiving sensitivity frequency response from the DAI to the ERP is within the mask given in ETS 300 085 [6], subclause 6.2.1.2.

**Test case:**

II.11.1.3.

**Conformance requirement:**

The receiving sensitivity frequency response shall be within the mask given in ETS 300 085 [6], subclause 6.2.1.2.

**Requirement reference:**

GSM 03.50 para. 3.8.1.2.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

**11.4 Test 4**

**Test purpose:**

- 1) To verify that the Receiving Loudness Rating (RLR) is 2 +/- 3 dB.
- 2) To verify that if a user controlled receive volume control is provided the Receive Loudness Rating (RLR) is not less than -13 dB when the control is set to maximum.

**Test case:**

II.11.1.4.

**Conformance requirement:**

- 1) The Receiving Loudness Rating (RLR) shall be 2 +/- 3 dB.  
  
If a user controlled receive volume control is provided the equipment shall meet this value for at least one setting of the control.
- 2) If a user controlled receive volume control is provided the Receive Loudness Rating (RLR) shall be not less than -13 dB when the control is set to maximum.

**Requirement reference:**

GSM 03.50 para. 3.1.1.

SUPPLEMENTARY INFORMATION:

Test case justification:

- 1) If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.
- 2) If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.

EC Terminal Directive reference:

Article 4g.

**11.5 Test 5**

**Test purpose:**

To verify that the Side Tone Masking Rating (STMR) is 13 +/- 5 dB.

**Test case:**

II.11.1.5.

**Conformance requirement:**

The Side Tone Masking Rating (STMR) shall be 13 +/- 5 dB.

**Requirement reference:**

GSM 03.50 para. 3.10.1.

SUPPLEMENTARY INFORMATION:

Test case justification:

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

EC Terminal Directive reference:

Article 4g.

**11.6 Test 6**

**Test purpose:**

To verify that the Echo Return Loss from the input to the output of the reference speech codec in the SS is at least 46 dB.

**Test case:**

II.11.1.7.1.

**Conformance requirement:**

The Echo Return Loss from the input to the output of the reference speech codec in the SS shall be at least 46 dB.

**Requirement reference:**

GSM 03.50 para. 3.4.1.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

**11.7 Test 7**

**Test purpose:**

To verify that the stability margin is at least 6 dB.

**Test case:**

II.11.1.7.2.

**Conformance requirement:**

The stability margin shall be at least 6 dB.

**Requirement reference:**

GSM 03.50 para. 3.2.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

**11.8 Test 8**

**Test purpose:**

To verify that the ratio of signal to total distortion power in the sending direction measured at the DAI with psophometric filter is above the limits given in ETS 300 085 [6], subclause 6.2.5.1.2.

**Test case:**

II.11.1.8.1.

**Conformance requirement:**

The ratio of signal to total distortion power in the sending direction measured at the DAI with psophometric filter shall be above the limits given in ETS 300 085 [6], subclause 6.2.5.1.2.

**Requirement reference:**

GSM 03.50 para. 3.9.1.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

*If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.*

*EC Terminal Directive reference:*

*Article 4g.*

## **12 Testing of speech transcoding functions**

### **12.1 Downlink speech transcoding**

**Test purpose:**

To verify that the speech transcoder of the MS can transform all the predefined sequences (SEQ01.COD, SEQ03.COD, SEQ04.COD and SEQ05.COD) at 13 kbit/s level to 104 kbit/s (13 bit linear PCM at 8 kHz) level correctly.

**Test case:**

II.13.1.

**Conformance requirement:**

The output bit stream from the speech transcoder shall be continuous and bit by bit exactly the same as the predefined output sequence (SEQ01.OUT, SEQ03.OUT, SEQ04.OUT and SEQ05.OUT).

**Requirement reference:**

GSM 06.01, 2, GSM 06.10, 5.2/5.2.2.

SUPPLEMENTARY INFORMATION:

*Test case justification:*

*If this requirement is not met, the output speech quality will be degraded so that interworking via the public network is not guaranteed.*

*EC Terminal Directive reference:*

*Article 4g.*

### **12.2 Uplink speech transcoding;**

**Test purpose:**

To verify that the speech transcoder of the MS can transform all the predefined sequences (SEQ01.INP, SEQ02.INP, SEQ03.INP and SEQ04.INP) at 104 kbit/s (13 bit linear PCM at 8 kHz) level to 13 kbit/s level correctly.

**Test case:**

II.13.3.

**Conformance requirement:**

The output bit stream from the speech transcoder shall be bit by bit exactly the same as the predefined output sequence (SEQ01.COD, SEQ02.COD, SEQ03.COD and SEQ04.COD).

**Requirement reference:**

GSM 06.01, 2, GSM 06.10, 5.2/5.2.1.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*If this requirement is not met, the coding of speech information will be incorrect so that interworking via the public network is not guaranteed.*

*EC Terminal Directive reference:*

*Article 4g.*

**12.3 Uplink transmitter DTX functions**

**Test purpose:**

To verify that the combination of VAD and DTX operates correctly.

**Test case:**

II.13.4.

**Conformance requirement:**

The MS VAD and DTX function allows only those frames to be transmitted that are either marked with SP=1 or that are properly positioned SIDÄframes.

**Requirement reference:**

GSM 05.08, 8.3, GSM 06.01, 3/4, GSM 06.31, 2.1/2.1.1/2.1.2, GSM 06.32, 1/2/2.1/2.2.8.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*DTX functions are mandatory for implementation in all GSM mobile stations. If a mobile station fails to perform the required functions, annoying effects like speech clipping, modulation of the background noise or even cutting the transmission on the radio path could take place and interworking via the public network is not guaranteed.*

*EC Terminal Directive reference:*

*Article 4g.*

**12.4 Speech channel transmission delay**

**Test purpose:**

To verify that the round trip delay of a speech channel for a MS which consists of the sum of:

- the downlink delay from RF input to DAI output;
- DAI output to ERP;
- MRP to DAI output; and
- DAI to uplink RF output,

meets the requirements when using the predefined test sequences SEQ01.COD, SEQ03.COD, SEQ04.COD and SEQ05.COD.

**Test case:**

II.13.5.1/2/3/4.

**Conformance requirement:**

The overall speech channel transmission delay shall be less than 144.9 ms.

**Requirement reference:**

Although the delay of 144.9 ms at maximum is not mentioned explicitly, calculations based on figures indicated in GSM 03.05, section 4.2.1 will lead to this delay, when the specific test method used is considered.

**SUPPLEMENTARY INFORMATION:**

*Test case justification:*

*If the delay requirement for GSM mobile stations is not met, the overall circuit delay experienced by users will be unacceptable causing conversational difficulties. Interworking via the public network is not guaranteed.*

*EC Terminal Directive reference:*

*Article 4g.*



**Annex A (informative): TBR 9 MATRIX**

TBR Identification	GSM 11.10 Test Case	GSM Core Specification	Terminal Directive
8.1	II.4.1.2/3	05.05, 6.4 b)	4g
9.1.1	II.5.3.8.1.2.2.4	04.08, 3.4.3 04.08, 5.1.3/5.2.1.1.4 04.08, 5.2.1.1.9/5.5.1/11.3	4g
9.2.1	II.5.3.8.2.4.7 proc.4	04.08, 5.2.1.2 02.30, 4.4.2.2	4g
9.2.2	II.5.3.8.2.6.7 proc.4	04.08, 5.2.1.2 02.30, 4.4.2.2	4g
9.3	II.5.3.8.3.3.3 req.4	04.08, 5.5.4.3	4g
10.1/tp1	II.5.3.9.2.2 b)/c) II.5.3.9.2.3 1)	02.07	4e, 4g
10.1/tp2	II.5.3.9.2.2 b)-k) II.5.3.9.2.3 8)	04.08, 5.2.1.1.6/5.1.3	4g
10.2/tp1	II.5.3.9.3.2 a) II.5.3.9.3.3 1)	02.07	4e, 4g
10.2/tp2	II.5.3.9.3.2 b)/c)/d) II.5.3.9.3.3 4)	04.08, 5.2.1.1.6/5.1.3	4g
10.3/tp1	II.5.3.9.4.3 req.7)	04.08, 5.2.2.3.2	4g
10.3/tp2	II.5.3.9.4.3 req.10)	04.08, 5.2.2.6/5.1.3	4g
10.4/tp1	II.5.3.9.5.3 req.2)	04.08, 5.2.2.3.2	4g
10.4/tp2	II.5.3.9.5.3 req.6)	04.08, 5.2.2.6/5.1.3	4g
11.1	II.11.1.1	03.50, 3.8.1.1	4g
11.2	II.11.1.2	03.50, 3.1.1	4g
11.3	II.11.1.3	03.50, 3.8.1.2	4g
11.4/tp1	II.11.1.4	03.50, 3.1.1	4g
11.4/tp2	II.11.1.4	03.50, 3.1.1	4g
11.5	II.11.1.5	03.50, 3.10.1	4g
11.6	II.11.1.7.1	03.50, 3.4.1	4g
11.7	II.11.1.7.2	03.50, 3.2	4g
11.8	II.11.1.8.1	03.50, 3.9.1	4g
12.1	II.13.1	06.01, 2 06.10, 5.2/5.2.2	4g
12.2	II.13.3	06.01, 2 06.10, 5.2/5.2.1	4g
12.3	II.13.4	05.08, 8.3 06.01, 3/4 06.31, 2.1/2.1.1/2.1.2 06.32, 1/2/2.1/2.2.8	4g
12.4	II.13.5.1/2/3/4	11.20, Annex 3	4g

## History

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