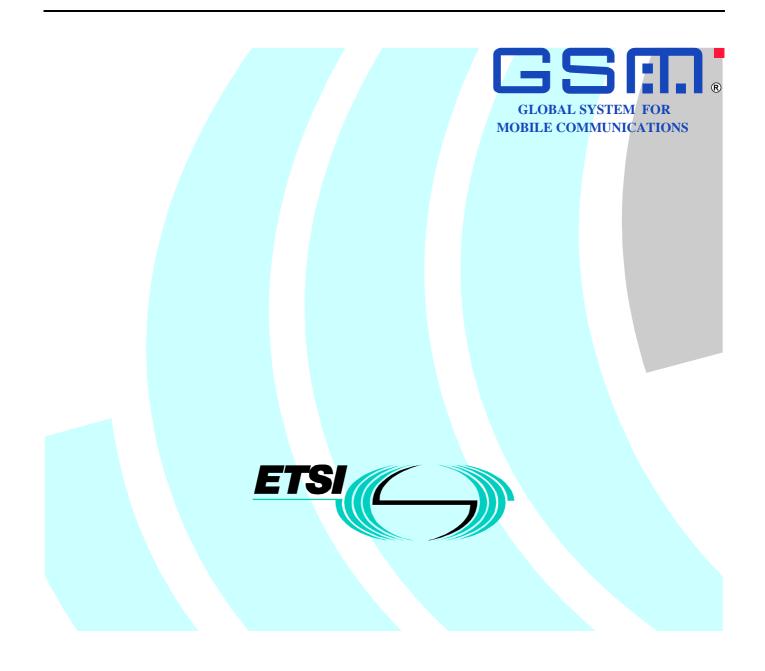# ETSI EN 301 420 V4.0.1 (1999-12)

Candidate Harmonized European Standard (Telecommunications series)

Digital cellular telecommunications system (Phase 2); Attachment requirements for Global System for Mobile communications (GSM); Mobile stations in the DCS 1 800 band and additional GSM 900 band; Telephony (GSM 13.02 version 4.0.1)

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Contents

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by the Special Mobile Group (SMG).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 98/13/EC of the European Parliamant and of the Council relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity ("Directive 98/13/EC").

Technical specifications relevant to the 98/13/EC Directive are given in the Requirements Table (RT) in annex A.

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

This standard contains the procedures and requirements for the approval testing of GSM terminal equipment for speech. These requirements apply to terminals for Phase 2 of the public land mobile radio service, operating in:

- the DCS 1 800 band; or

- the GSM 900 band; or

- both in the DCS 1 800 band and the GSM 900 MHz band.

The requirements of other standards apply in addition to this standard.

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 standard is based on the EN 300 607-1 (GSM 11.10-1) [2].

> NOTE: The present document for Phase 2 may be developed in stages. The first release will include, as a minimum, all of the basic Phase 2. Subsequent releases will include additional requirements.

The contents of the present document may be subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this EN it will then be re-submitted for formal approval procedures by ETSI with an identifying change of release date and an increase in version number as follows:

Version 4.x.y

where:

4   GSM Phase 2;

x   the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.;

y   the third digit is incremented when editorial only changes have been incorporated in the specification.

National transposition dates	
Date of adoption of this EN:	3 December 1999
Date of latest announcement of this EN (doa):	31 March 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 September 2000
Date of withdrawal of any conflicting National Standard (dow):	30 September 2000

1 Scope

The present document specifies the technical requirements to be met by terminal equipment capable of connecting to a public telecommunications network. These requirements apply to terminals for Phase 2 of the public land mobile radio service, operating in:

- the DCS 1 800 band; or

- the GSM 900 band; or

- both in the DCS 1 800 band and the GSM 900 MHz band.

with a channel separation of 200 kHz, utilizing constant envelope modulation and carrying traffic channels according to the Time Division Multiple Access (TDMA) principle.

This standard specifies the access requirements for terminals as stated above implementing the GSM standard.

For each test purpose and its corresponding conformance requirement, a reference is given to EN 300 607-1 (GSM 11.10-1) [2]. The requirements apply to speech transmission.

The measurement uncertainty is handled, as described in EN 300 607-1 (GSM 11.10) [2].

This standard covers the essential requirements of the Directive 98/13/EC [1] Article 5g. Articles 5d, 5e, and 5f are covered by EN 301 419-1 (GSM 13.01) [6].

The Terminal Directive 98/13/EC Articles 5a and 5b are covered by other directives, and, therefore, not by this standard.

In this standard, there are no Electromagnetic Compatibility technical requirements in terms of the Terminal Directive 98/13/EC, Article 5c.

NOTE 1: 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.

EN 300 607-1 (GSM 11.10) [2] constitutes the conformance test suite referenced by this TBR. The verification of the conformance requirements in this TBR is based on the tests described in this reference. The set of requirements in EN 300 607-1 (GSM 11.10) [2] and the set of requirements in this TBR need not be identical.

Some requirements only apply to specific types of mobile station (e.g. data tests only apply to mobile stations with a data facility). The standard also indicates the specific test which shall be carried out for each mobile station type.

An active accessory is covered by this standard if it modifies the terminal performance in an aspect which affects conformance to essential requirements.

NOTE 2: Only active devices are subject to this standard. Accessories may be tested with specific terminals, and either approved for use with those terminals only, or may possibly be approved for use with a wider range of terminals, depending on the nature and effect of the accessory.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1]   Directive 98/13/EC of the European Parliament and of the Council of 12 February 1998 "relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity" (Official Journal, L74/1, 12.3.98). (The Directive)

[2]   EN 300 607-1 (GSM 11.10-1): "Digital cellular telecommunications system (Phase 2); Mobile station conformity specifications".

[3]   Void.

[4]   EN 300 540 (GSM 03.50): "Digital cellular telecommunications system (Phase 2); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".

[5]   EN 300 504 (GSM 02.06): "Digital cellular telecommunication system (Phase 2); Types of Mobile Stations (MS)".

[6]   EN 301 419-1: "Digital cellular telecommunications system (Phase 2); Attachment requirements for Global System for Mobile communications (GSM); Part 1: Mobile stations in the GSM 900 and DCS 1 800 bands; Access (GSM 13.01 version 4.0.0)".

3 Abbreviations

For the purposes of this standard, the following abbreviations apply:

DTX   Discontinuous Transmission (mechanism)
EL   Echo Loss
MMI   Man Machine Interface
MS   GSM Mobile Station
TCH/FS   Full rate Traffic CHannel for Speech
TCH/HS   Half rate Traffic CHannel for Speech

4 General requirements

The requirements of this standard apply to the following classes of terminal:

- Terminals operating only in the DCS 1 800 band. These terminals shall conform to the requirements of clause 5.

- Terminals operating in the DCS 1 800 band and in the GSM 900 band (including terminals operating in the Extended GSM 900 band) either simultaneously or in one band at a time. These terminals shall conform to:

  the requirements of clause 5 of this standard.

5 Requirements

Table 1 contains all requirements that are needed to meet the essential requirements as defined in the Directive [1]. A justification according to article 5 of the Directive is given by stating the relevant category (g) together with a text supporting the justification.

The entries are defined as follows:

- "EN 300 607-1 Item" defines the item number of the conformance requirement and also the reference to EN 300 607-1 (GSM 11.10-1) [2]. This reference is a normative reference to a subclause of EN 300 607-1 (GSM 11.10-1) [2] containing the conformance requirement text, and references to the base standard.

- "Description" contains a short description of the requirement.

- "EN Justification" contains supplementary information to explain the justification of the requirement according to article 5 of the Directive [1].

- "TD Cat" defines the category according to article 5 of the Directive [1].

- "Test Cat" is defined as follows:

  - an "X" indicates a special test situation (e.g. a manufacturer's declaration of some sort);

  - a blank entry indicates conformity is by the test referred to by this standard;

  - an asterisk (*) indicates that, where the terminal supports both the GSM 900 and DCS 1 800 bands either the test in the DCS 1 800 band or the equivalent test in the GSM 900 band is performed, and that a special test situation applies for the test which is not performed.

Table 1: Requirements and Justifications

EN 300 607-1 Item	Description	Justification	TD Cat	Test Cat
14.4.3	Co channel rejection - TCH/HS (SID frames).	Non compliance in this area may impair speech quality.	g	
30.1	Sending sensitivity / frequency response.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.2	Sending loudness rating.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.3	Receiving sensitivity / frequency response.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.4	Receiving loudness rating.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.5.1	Side Tone Masking Rating (STMR).	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.5.2	Listener Side Tone Rating (LSTR).	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	X
30.6.1	Telephone acoustic coupling loss (TAL) - Echo loss (EL).	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.6.2	Telephone acoustic coupling loss (TAL) - Stability margin.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
30.7.1	Distortion - Sending.	If this requirement is not met, the MS will not be able to produce a reasonable speech intelligibility.	g	*
32.1	Testing of speech transcoding functions / Full Rate Downlink speech transcoding.	If this requirement is not met, the output speech quality will be degraded so that interworking via the public network is not guaranteed.	g	X
32.2	Full Rate Downlink receiver DTX functions.	Failure in this area will affect the intelligibility of the telephony signal.	g	X
32.3	Full Rate Uplink speech transcoding.	If this requirement is not met, the coding of the speech information will be incorrect so that interworking via the public network is not guaranteed.	g	X
32.4	Full Rate Uplink transmitter DTX functions.	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.	g	X
32.5.4	Full Rate Speech channel transmission delay - Downlink processing delay.	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.	g	X
32.5.5	Full Rate General test of transparency of MMI inputs - Downlink coding delay.	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.	g	X

EN 300 607-1 Item	Description	Justification	TD Cat	Test Cat
32.5.6	Full Rate General test of transparency of MMI inputs - Uplink processing delay.	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.	g	X
32.5.7	Full Rate General test of transparency of MMI inputs - Uplink coding delay.	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.	g	X
32.6	Testing of speech transcoding functions / Half Rate Downlink speech transcoding.	If this requirement is not met, the output speech quality will be degraded so that interworking via the public network is not guaranteed.	g	X
32.7	Half Rate Downlink receiver DTX functions.	Failure in this area will affect the intelligibility of the telephony signal.	g	*
32.8	Half Rate Uplink speech transcoding.	If this requirement is not met, the coding of the speech information will be incorrect so that interworking via the public network is not guaranteed.	g	*
32.9	Half Rate Uplink transmitter DTX functions.	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.	g	*
32.10.4	Half rate speech channel transmission delay / downlink processing delay.	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.	g	X
32.10.5	Half rate speech channel transmission delay / downlink coding delay.	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.	g	X
32.10.6	Half rate speech channel transmission delay / uplink processing delay.	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.	g	X
32.10.7	Half rate speech channel transmission delay / uplink coding delay.	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.	g	X

Annex A (normative):
The Requirement Table (RT)

A.1   Introduction to the RT

This RT provides a summary of all the requirements of this standard. It shows the status of each EN-Requirement (EN-R), whether it is essential to implement in all circumstances, or whether the requirement is dependant on the manufacturer having chosen to support a particular optional service or functionality. In particular, it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified.

The static requirements proforma provides the means to capture the choices which the manufacturer has made in implementing the equipment.

The dynamic requirements proforma indicates the choices for which conformance is claimed for.

When completed in respect of a particular equipment, the tables provide a means to undertake the static assessment of conformity with the standard, and to select the appropriate test cases to be used in dynamically testing the equipment.

References to items

For each possible item answer (answer in the support column) within the static requirements tables, there exists a unique reference, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns shall be discriminated by letters (a, b, etc.), respectively.

EXAMPLE 1:   A.5/4 is the reference to the answer of item 4 in table A.5.

EXAMPLE 2:   A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table A.6.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.2   Format of the tables

The entries of the static requirement tables are defined as follows:

-    In the "Item" column, a local entry number for the requirement in the RT is given.

-    In the "Description" column, a short non-exhaustive description of the requirement is found.

-    The "Ref." column references the corresponding clause of base standard or EN 300 607-1 (GSM 11.10-1) [2].

-    In the "Status" column, the status of the entry, as further detailed in the following clause, is indicated.

-    The "Support" column is blank in the proforma, and shall be completed by the manufacturer in respect of each particular requirement to indicate the choices, which have been made in the implementation.

-    The "Mnemonic" assigns a symbolic name to the static requirement.

The entries of the dynamic requirement tables are defined as follows:

-    "EN 300 607-1 Item" defines the item number of the conformance requirement and also the reference to EN 300 607-1 (GSM 11.10-1) [2]. This reference is a normative reference to a section of EN 300 607-1 (GSM 11.10-1) [2] containing the conformance requirement text, and references to the base standard.

- In the "Description" column, a short non-exhaustive description of the requirement is found.

- In the "TD Cat" column, the class of essential requirements is indicated. Essential requirements are classified according to article 5 of the EC Council Directive, 98/13/EC. The only valid entry in this RT is g, corresponding to respectively "interworking of terminal equipment via the public telecommunication network".

- In the "Status" column, the status of the entry, as further detailed in the following clause, is indicated.

- The "Support" column is blank in the proforma, and shall be completed by the manufacturer in respect of each particular requirement to indicate the choices, for which conformance is claimed for.

A.3   References to EN 300 607-1 (GSM 11.10-1)

The reference number in column "EN 300 607-1 Item" references subclauses in EN 300 607-1 (GSM 11.10-1) [2].

A.4   Notations used in the RT

A.4.1   Status Notations

The "STATUS" column shows the status of the entries as follows:

M   Mandatory, shall be implemented under all circumstances.

O   Optional, may be provided, but if provided shall be implemented in accordance with the requirements.

O.<n>   This status is used for mutually exclusive or selectable options among a set, in cases where it is mandatory to implement one or more options among a set. The integer <n> refers to a unique group of options within the RT. A footnote under the table in which it is used states explicitly what the requirement is for each numbered group.

C<n>   Conditional number <n>. Reference is made to a Boolean expression under the table with predicates of support answers, which will resolve to either "M", "X", "N", or "O.<n>" for a specific implementation. In all cases "ELSE Not Applicable" is implied, if an ELSE expression is omitted.

N/A   Not applicable.

X   Excluded or Prohibited.

A.4.2   Support Answer Notations

The "support" column is reserved for completion in respect of a particular implementation. Entries may be:

Yes (or Y or y)   Indicating that the implementation claims to fully implement the EN-R in accordance with the specification. The entry of a "Yes" against an "X" status entry means the equipment does not conform to the standard.

No (or N or n)   Indicating that the implementation does not claim full support of the EN-R in accordance with the specification. The entry "No" against an "M" status entry means the equipment does not conform to the standard.

A.5 The Requirement Tables

A.5.1 Static Requirements, RT A

Table A.1: Static Requirements

Item	Description	Ref.	Status	Support	Mnemonic
1	Speech Half Rate.	GSM 02.06 [5]	O		TSPC_AddInfo_HalfRateSpeech
2	Handset MS supporting speech.	GSM 03.50, 3 [4]	O		TSPC_AddInfo_SpeechHandset

A.5.2 Dynamic Requirements, RT B

Table A.2: Dynamic Requirements

EN 300 607-1 Item	Description	TD Cat	Status	Supported
14.4.3	Co channel rejection - TCH/HS (SID frames).	g	C1	
30.1	Sending sensitivity / frequency response.	g	C2	
30.2	Sending loudness rating.	g	C2	
30.3	Receiving sensitivity / frequency response.	g	C2	
30.4	Receiving loudness rating.	g	C2	
30.5.1	Side Tone Masking Rating (STMR).	g	C2	
30.5.2	Listener Side Tone Rating (LSTR).	g	C2	
30.6.1	Telephone acoustic coupling loss (TAL) - Echo loss (EL).	g	C2	
30.6.2	Telephone acoustic coupling loss (TAL) - Stability margin.	g	M	
30.7.1	Distortion - Sending.	g	C2	
32.1	Testing of speech transcoding functions / Full rate Downlink speech transcoding.	g	M	
32.2	Full rate Downlink receiver DTX functions.	g	M	
32.3	Full rate Uplink speech transcoding.	g	M	
32.4	Full rate Uplink transmitter DTX functions.	g	M	
32.5.4	Full rate Speech channel transmission delay - Downlink processing delay.	g	M	
32.5.5	Full rate General test of transparency of MMI inputs - Downlink coding delay.	g	M	
32.5.6	Full rate General test of transparency of MMI inputs - Uplink processing delay.	g	M	
32.5.7	Full rate General test of transparency of MMI inputs - Uplink coding delay.	g	M	
32.6	Testing of speech transcoding functions / Half rate Downlink speech transcoding.	g	C1	
32.7	Half rate Downlink receiver DTX functions.	g	C1	
32.8	Half rate Uplink speech transcoding.	g	C1	
32.9	Half rate Uplink transmitter DTX functions.	g	C1	
32.10.4	Half rate Speech channel transmission delay - Downlink processing delay.	g	C1	
32.10.5	Half rate speech channel transmission delay / Downlink coding delay.	g	C1	
32.10.6	Half rate speech channel transmission delay / Uplink processing delay.	g	C1	
32.10.7	Half rate speech channel transmission delay / Uplink coding delay.	g	C1	
C1	IF A.1/1 THEN M ELSE N/A		-- AddInfo_HalfRateSpeech	
C2	IF A.1/2 THEN M ELSE N/A		-- AddInfo_SpeechHandset	

History

Document history			
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