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Technical Specification

Digital cellular telecommunications system (Phase 2+); Procedure for call progress indications (GSM 02.40 version 7.0.1 Release 1998)



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GLOBAL SYSTEM FOR
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Reference

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ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet

secretariat@etsi.fr
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Foreword

This Technical Specification (TS) has been produced by the Special Mobile Group (SMG).

The present document defines requirements for call progress and related information to be provided to users of the GSM system.

The contents of the present document is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document, it will be re-released by SMG with an identifying change of release date and an increase in version number as follows:

Version 7.x.y

where:

- 7 indicates GSM Phase 2+ Release 1998;
- 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;

1 Scope

The present document defines requirements for call progress and related information to be provided to users of the GSM system.

1.1 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.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

- [1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.30: "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".
- [3] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [4] CEPT Recommendation T/CS 20-15: "Tones and announcements".
- [5] CEPT Recommendation T/S F23: "Relative aux définitions et caractéristiques audibles des tonalités et des annonces parlées".
- [6] ANSI T1.607: "Digital Subscriber Signalling System No.1-Layer 3 Signalling Specification for Circuit Switched Bearer Service".

1.2 Abbreviations

Abbreviations used in the present document are listed in GSM 01.04.

1.3 General

There are aspects of the Man Machine Interface (MMI) of the GSM Network which relate to users, but which are not covered by GSM 02.30, which deals specifically with the MMI of the Mobile Station (MS). The present TS covers the means by which mobile users, and callers to a GSM network, will be given information regarding progress of their calls.

Indications of call progress, such as ringing, engaged, unobtainable, and no radio channel, may in principle be verbal message, tones, displayed text or graphical symbols. Which combination of these applies may depend on the message, the MS and selection by the user or PLMN operator. However, verbal announcements will generally be reserved for situations which are peculiar to a mobile network, where users may be unfamiliar with any tone chosen to indicate conditions such as "call diversion" or "subscriber not available".

It may also be desirable to add comfort indications (e.g. tones, noise, music, clicks) while a call is being connected, since silence may cause an unfamiliar user to believe that nothing is happening.

Generally, on data calls, and on the data part of alternate speech/data or speech-followed-by-data calls, PLMN generated network tones and announcements should be muted.

2 Supervisory tones

2.1 General

Supervisory Tones, indicating primarily ringing, engaged and unobtainable numbers, may be generated by both the PLMN and PSTN.

Except for ring tone, all tones indicating call progress to a MS user shall be generated in the MS, on the basis of signals from the network where available, and are according to the standard defined in the present document.

Tones sent to a caller to a MS will be generated in the network, generally local to the caller, and will be to the standard of his local exchange, except for mobile to mobile calls, where the tones will be generated in the calling MS. For mobile terminated calls, the ring tone will be generated in the called MSC (except OACSU).

2.2 Method

In the interests of early release of the traffic channel on failure to succeed in setting up a (mobile originated) call, where possible supervisory tones should be indicated over signalling channels. The MS will then generate the required tones. However, if the network generates an in-band announcement this will be indicated to the MS. In this case the MS shall connect the user to the announcement until instructed to release the call, either by the user or by the network. An alternate procedure may apply for MS able to generate appropriate announcements internally (see clause 3).

The ring tone will be sent over the traffic channel, since this channel must be available for traffic immediately it is answered (exception: Off Air Call Set Up). The Ring Tone is therefore generated by the PLMN or PSTN supporting the called phone.

On failed mobile terminated call attempts, the called MSC will either signal to the caller, if this is possible, or else will generate the required supervisory tones.

"Alert" is not a supervisory tone. The indication is signalled, and the MS may generate any form of indication to the user that the MS is being called.

2.3 Standard tones

MS generated tones will be generally in accordance with CEPT (GSM 900 and DCS 1800), or ANSI T1.607 (PCS 1900 for NA) recommendations, where appropriate, and are listed in table 1. Any network originated tones will be according to PLMN or PSTN choice.

2.4 Applicability

This method will apply in all cases where signalling is capable of indicating the supervisory tone required. However, for connection to certain fixed networks where this signalling is not possible, fixed network tones will be carried over the traffic channel.

Mobile Stations may employ any suitable technique to indicate supervisory information. However, if tones are employed, they shall be in accordance with the present document. The use of these tones in the MSC is preferred.

NOTE 1: The tones and/or announcement to the calling party should not be provided if the Information transfer capability is set to UDI.

NOTE 2: For a call with information transfer capability set to 3.1 kHz, the use of tones and/or announcement may cause the expiry of an awaiting answer timer in a modem or fax machine.

2.5 Point of introduction

Introduction E1.

2.6 Comfort tones

If desired by the PLMN operator, the network may optionally introduce "comfort tones" while the call is being connected, during what would otherwise be silence. This would be overridden by indication of a supervisory tone, an announcement or by traffic. PLMNs may offer this feature optionally to incoming or outgoing callers.

The "comfort tones" may take the form of tones, clicks, noise, music or any other suitable form, provided that they cannot be confused with other indications that might be expected.

This feature is intended to indicate to the user that his call is progressing, to prevent him terminating the call prematurely.

Table 1: Supervisory tones in GSM MSs

Tone		Frequency		Tolerance	Type	
		GSM 900/ DCS 1800	PCS 1900 for NA		GSM 900 / DCS 1800	PCS 1900 for NA
1	Dial tone (optional)	425Hz	350Hz added to 440Hz	15Hz	Continuous	Continuous
2 *	Subscriber Busy (Called Number)	425Hz	480Hz added to 620Hz	15Hz	Tone on 500ms Silence 500ms	Tone on 500ms Silence 500ms
3 *	Congestion	425Hz	480Hz added to 620Hz	15Hz	Tone on 200ms Silence 200ms	Tone on 250ms Silence 250ms
4	Radio Path Acknowledgement (Mobile Originated only) (optional)	425Hz	425Hz	15Hz	Single tone 200ms	Single tone 200ms
5	{Radio Path Not Available {Call Dropped – Mobile originated only	425Hz	425Hz	15Hz	200ms} On/off 200ms} for 3 burst	200ms} On/off 200ms} for 3 burst
6 *	Error/Special Information } Number Unobtainable } Authentication Failure }	950Hz 1400Hz 1800Hz	950Hz 1400Hz 1800Hz	50Hz 50Hz 50Hz	{Triple Tone {Tones on 330ms {Silence 1.0s	{Triple Tone {Tones on 330ms {Silence 1.0s
7	Call Waiting Tone	425 Hz (tolerance 15Hz), on for 200ms, off for 600ms on for 200ms, off for 3s, on for 200ms, off for 600ms on for 200ms. This tone is superimposed on the audio traffic received by the called user. Alternate tones are <i>acceptable</i> but not preferred.				
			440 Hz, on for 300 ms, 9.7s off followed by (440 Hz, on for 100 ms off for 100 ms, on for 100 ms, 9.7s off and repeated as necessary) This tone is superimposed on the audio traffic received by the called user.			
Definition of these and other tones, together with advice on announcements, may be found in CEPT T/CS 20-15 and in T/SF 23.						
* The duration of these tones is an implementation option. However, in each case, the MS should be returned immediately to the idle state, and will be able to originate/receive calls, which will override these tones.						
Ringing Tone (Alternative national options permitted)		425Hz	440Hz added to 480Hz	15Hz	Tone on 1s Silence 4s	Tone on 2s Silence 4s

For application of Call Control Cause Information Elements to these tones, see Annex A, GSM 02.40.
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3 Recorded announcements

In present networks, both fixed and cellular, the language of recorded announcements and displayed information is invariably that of the country of origin. However, this is generally undesirable in a multi-lingual environment such as is encountered on a pan-European network with international roaming. It is therefore probably desirable to minimise the number of such announcements.

Advanced MSs may be designed which have the ability to generate announcements in the form desired by the user, e.g. in the language preferred by the user. In this case, it becomes necessary to block any verbal announcements sent from the network towards the MS, to avoid clashes with those generated by the MS. The MS may be allowed to block in-band announcements in case appropriate announcements according to the Cause Information Elements (annex A) can be generated. The default setting of the MS shall be "non blocking", which could be set by MMI command to "blocking".

Announcements generated by the PLMN and sent to callers to that PLMN will generally be in the language of the PLMN. However, on some fixed networks it will be possible for the message to be signalled back to the caller's local exchange, which will then generate the announcement in its local language.

Annex A (normative): Application of call control cause information elements to supervisory tones

The Cause Information Elements are listed and defined in GSM 04.08. This annex lists these elements and indicates which supervisory tone should be generated in response. It should be noted that some conditions (e.g. radio path not available, dropped call) may be deduced by the MS, rather than signalled explicitly over the air interface. All causes not listed below should result in the generation of tone 6. In case of multiple calls a tone should only be generated if it does not disturb an ongoing active call. "-" indicates no tone required.

Cause CC		Tone (see table 1)
16	Normal Clearing	1
17	User Busy	2
22	Number Changed	-
30	Response to STATUS ENQUIRY	-
31	Normal, unspecified	-
34	No circuit/channel available	3
41	Temporary Failure	3
42	Switching Equipment Congestion	3
44	Requested circuit/channel not available	3
49	Quality of Service Unavailable	3
58	Bearer Capability not available	3

Annex B (informative): Change history

Change history					
SMG No.	TDoc. No.	CR. No.	Subclause affected	New version	Subject/Comments
					Annex B First introduced at SMG#27
21		A001	Annex A		Update and approve Annex A
SMG#27	98-0549	A002	0.1 Normative references 2.3 Standard tones 2.6 Comfort tones		Procedure for call progress indications. Harmonization between GSM 02.40 version 5.0.0 and J-STD-007 Volume 7.

History

Document history		
V6.0.0	April 1999	Publication
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