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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Mobile Stations (MS) features
(GSM 02.07 version 7.1.0 Release 1998)**



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Foreword

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

The present document specifies Mobile Station features within the digital cellular telecommunications system (Phase 2+).

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 Mobile Station (MS) features and to classifies them according to their type and whether they are mandatory or optional. The MS features detailed in the present document do not represent an exhaustive list. Those MS features which are subject to Type Approval are described in GSM 11.10 [13].

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 telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".
- [3] GSM 02.04: "Digital cellular telecommunications system (Phase 2+); General on supplementary services".
- [4] GSM 02.11: "Digital cellular telecommunications system (Phase 2+); Service accessibility".
- [5] GSM 02.16: "Digital cellular telecommunications system (Phase 2+); International Mobile station Equipment Identities (IMEI)".
- [6] GSM 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber identity modules; Functional characteristics".
- [7] GSM 02.30: "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".
- [8] GSM 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".
- [9] GSM 02.90: "Digital cellular telecommunications system (Phase 2+); Stage 1 description of Unstructured Supplementary Service Data (USSD)".
- [10] GSM 03.03: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".
- [11] GSM 03.14: "Digital cellular telecommunications system (Phase 2+); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".
- [12] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [13] GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".
- [14] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

- [15] GSM 02.43: "Digital cellular telecommunications system (Phase 2+); Support of Localised Service Area (SoLSA). Stage 1".

1.2 Definitions and abbreviations

For the purposes of the present document, the following terms and definitions apply.

An MS feature is defined as a piece of equipment of function which directly relates to the operation of the MS. On the basis of this, three categories of features can be distinguished: basic, supplementary and additional features.

Basic MS features: A basic MS feature is directly related to the operation of basic telecommunication services (e.g. key-pad function).

Supplementary MS features: A supplementary MS feature is directly related to the operation of supplementary services (e.g. display of calling line number).

Additional MS features: An additional MS feature is a feature which is neither a basic nor a supplementary feature (e.g. abbreviated dialling).

Additional MS features and supplementary services may be used independently according to the choice of subscribers/users (e.g. barring of outgoing calls). Features not directly relevant to the use as a Mobile Station are permitted, provided they do not interfere with the performance of the MS (e.g. a clock).

Abbreviations used in the present document are listed in GSM 01.04 [1].

2 Requirements for implementing MS features

MS features are qualified as mandatory or optional. Mandatory features have to be implemented as long as they are relevant to the MS type, and will be subject to Type Approval when applied according to GSM 11.10 [13]. Whether or not an optional feature is implemented is left to the manufacturers' discretion. The method of implementation of all MS features must be done in accordance with the appropriate GSM specifications. For all present and future MS features, manufacturers have the responsibility to ensure that the MS features will neither conflict with the air interface nor cause any interference to the network or any other MS or its own MS, and these requirements shall be recognized during the Type Approval process.

In the following tables 1, 2 and 3 the basic, supplementary and additional MS features are listed. Mandatory features are marked by "M". Optional features are marked by "O".

Additional MS features not listed in table 3 are permitted without the requirement for this table to be amended, provided that these new features do not affect the mandatory air interface requirements.

Unless otherwise stated for a particular feature, the feature supported by the Subscriber Identity Module (SIM) takes priority over the same feature supported by the Mobile Equipment (ME).

Table 1: Basic MS features

Name		Mandatory (M) Optional (O)	
1.1	Display of Called Number	M*	
1.2	Indication of Call Progress Signals	M*	
1.3	Country/PLMN Indication	M*	
1.4	Country/PLMN Selection	M	
1.5	Keypad	O	(note 1)
1.6	IMEI	M	
1.7	Short Message	M	(note 4)
1.8	Short Message Overflow Indication	M	
1.9	DTE/DCE Interface	O	
1.10	ISDN "S" Interface	O	
1.11	International Access Function ("+" key)	O	(note 1)
1.12	Service Indicator	M*	
1.13	Autocalling restriction capabilities		(note 2)
1.14	Emergency Calls capabilities	M	(note 3)
1.15	Dual Tone Multi Frequency function (DTMF)	M	(note 5)
1.16	Subscription Identity Management	M	
1.17	On/Off switch	O	
1.18	Subaddress	O	
1.19	Support of Encryption A5/1 and A5/2	M	
1.20	Short Message Service Cell Broadcast	M	
1.21	Short Message Service Cell Broadcast DRX	O	
1.22	Service Provider Indication	O	
1.23	Support of the extended SMS CB channel	O	
1.24	Support of Additional Call Set-up MMI Procedures	O	
1.25	Network Identity and Timezone	O	
1.26	Ciphering Indicator	M*	
1.27	Network's indication of alerting in the MS	O	(NI Alert in MS)
1.28	Network initiated Mobile Originated connection	O	
1.29	Support of Localised Service Area	O	
1.30	Support of GPRS Encryption	M	(note 6)

Descriptions are given in annex B.

* Mandatory where a human interface is provided, i.e. may be in-appropriate for MS driven by external equipment.

NOTE 1: The physical means of entering the characters 0-9, +, * and # may be keypad, voice input device, DTE or others, but it is mandatory that there shall be the means to enter this information.

NOTE 2: MTs with capabilities for Autocalling, or to which call initiating equipment can be connected via the "R" or "S" interface, shall restrict repeated call attempts according to the procedures described in annex A.

NOTE 3: Emergency calls shall be possible according to Teleservice 12 (see GSM 02.03 [2] and GSM 02.30 [7]). This feature is only required to be provided by ME supporting Telephony.

NOTE 4: Support of reception by the ME and storage of SMS MT in the SIM is mandatory, but its display is optional. Reception and storage of a message shall be indicated by the MS.

NOTE 5: The use of DTMF is only mandatory when the speech teleservice is being used or during the speech phase of alternate speech/data and alternate speech/facsimile teleservices.

NOTE 6: The implementation of GPRS encryption algorithm is mandatory for terminals supporting GPRS.

Table 2: Supplementary MS features

Name		Mandatory (M) Optional (O)
2.1	Control of Supplementary Services	(note 1)

NOTE 1: See annex B, subclause B.2.1.

Descriptions are given in annex B to GSM 02.07.

Table 3: Additional MS features

Name		Mandatory (M) Optional (O)
3.1	Abbreviated Dialling	O
3.2	Fixed Number Dialling	O
3.3	Barring of Dialed Numbers	O
3.4	DTMF Control Digits Separator	O
3.5	Selection of Directory No in Messages	O
3.6	Last Numbers Dialed	O
3.7	ME-SIM lock	O
3.8	Service Dialling Numbers	O

Descriptions are given in the appendix to GSM 02.07.

Annex A (normative):

Automatic calling repeat call attempt restrictions

Call set up attempts referred to in this annex are assumed to be initiated from peripheral equipment or automatically from the MT itself.

A repeat call attempt may be made when a call attempt is unsuccessful for the reasons listed below (as defined in GSM 04.08 [12]).

These reasons are classified in three major categories:

1) "Busy destination":

Cause number 17 User busy.

2) "Unobtainable destination - temporary":

Cause number 18 No user responding;
 19 User alerting, no answer;
 27 Destination out of order;
 34 No circuit/channel available;
 41 Temporary failure;
 42 Switching Equipment congestion;
 44 Requested circuit/channel not available;
 47 Resources unavailable, unspecified.

3) "Unobtainable destination - permanent/long term":

Cause number 1 Unassigned (unallocated) number;
 3 No route to destination;
 22 Number changed;
 28 Invalid number format (uncompleted number);
 38 Network out of order.

NOTE 1: Optionally, it is allowed to implement cause number 27 in Category 3, instead of Category 2, as this is desirable already in Phase 1.

The table below describes a repeat call restriction pattern to any B number. This pattern defines a maximum number (n) of call repeat attempts; when this number n is reached, the associated B number shall be blacklisted by the MT until a manual re-set at the MT is performed in respect of that B number. When a repeat attempt to anyone B number fails, or is blacklisted, this does not prevent calls being made to other B numbers.

For the categories 1 and 2 above, n shall be 10; for category 3, n shall be 1.

call attempts	Minimum duration between Call attempt
Initial call attempt	-
1st repeat attempt	5 sec
2nd repeat attempt	1 min
3rd repeat attempt	1 min
4th repeat attempt	1 min
5th repeat attempt	3 min
	.
nth repeat attempt	3 min

The number of B numbers that can be held in the blacklist is at the manufacturers discretion but there shall be at least 8. However, when the blacklist is full the MT shall prohibit further automatic call attempts to any one number until the blacklist is manually cleared at the MT in respect of one or more B numbers.

When automatic calling apparatus is connected to an MT1 or MT2, or where an MTO is capable of auto-calling, then the MT shall process the call requests in accordance with the sequence of repeat attempts defined above, i.e. requests for repeat attempts with less than the minimum allowed duration between them shall be rejected by the MT.

A successful call attempt to a number which has been subject to the call restrictions shown above (i.e. an unsuccessful call set up attempt has previously occurred) shall reset the "counter" for that number.

The "counter" for an unsuccessfully attempted B number shall be maintained in 24 hours or until the MT is switched off.

The automatic calling repeat call attempt restrictions apply to speech and data services.

NOTE 2: The restrictions only apply to unsuccessful Call Control activity, not to Radio Resource Management or to Mobility Management, so multiple attempts at radio channel access are not limited by this mechanism.

Annex B (normative): Description of Mobile Station features

The section numbers refer to the items in tables 1, 2 and 3. The implementation (optional or mandatory) is shown in these tables.

B.1.1 Display of called number

This feature enables the caller to check before call setup whether the selected number is correct.

B.1.2 Indication of call progress signals

Indications shall be given such as tones, recorded messages or visual display based on signalling information returned from the PLMN. On data calls, this information may be signalled to the DTE.

Call progress indicators are described in GSM 02.40 [8].

B.1.3 Country/PLMN indication

The country/PLMN indicator shows in which GSM PLMN the MS is currently registered. This indicator is necessary so that the user knows when "roaming" is taking place and that the choice of PLMN (GSM 02.11 [4] clause 5) is correct. Both the country and PLMN will be indicated. When more than one visited GSM PLMN is available in a given area such information will be indicated.

NOTE: The indication is described in GSM 02.30 [7].

B.1.4 Country/PLMN selection

When more than one GSM PLMN is available in a given area, the procedures for selection of PLMN are in conformity with GSM 02.11 [4].

B.1.5 Keypad

A physical means of entering numbers, generally, though not necessarily, in accordance with the layout shown in figure B.1.

See also GSM 02.30 [7] (Man-Machine Interface).

Additional keys may provide the means to control the Mobile Station (e.g. to initiate and terminate calls).

1	2	3
4	5	6
7	8	9
*	0	#

Figure B.1

B.1.6 IMEI

IMEI = International Mobile Station Equipment Identity.

Each MS shall have a unique identity and shall transmit this on request from the PLMN. For details see GSM 02.16 [5] and GSM 03.03 [10]. The IMEI is incorporated in a module which is built within the MS and is physically secured. The implementation of each individual module shall be carried out by the manufacturer.

B.1.7 Short message indication and acknowledgement

This feature allows the delivery of short messages to a MS from a service centre. Such messages are submitted to the service centre by a telecommunications network user who can also request information of the status of the message by further interrogation of the service centre. The service centre then transmits the message to an active MS user.

The MS must therefore provide an indication to the user that a message has been received from the service centre and must also send an acknowledgement signal to the PLMN to show that this indication has been activated. The PLMN then returns this acknowledgement to the service centre.

The short message service teleservice is described in specification GSM 02.03 [2].

B.1.8 Short message overflow indication

An indication shall be given to the SM user of the short message service when an incoming message cannot be received due to insufficient available memory.

B.1.9 DTE/DCE interface

A standard connector for attachment of a DTE to the MS and use in conjunction with data services, as defined in the 07 series specifications.

B.1.10 ISDN "S" terminal interface

A standard connector for attachment of equipment to ISDN standard I.420.

B.1.11 International access function

Provision is made for a direct, standard method of gaining international access. For this purpose the MS may have a key whose primary or secondary function is marked "+". This is signalled over the air interface and would have the effect of generating the international access code in the network. It may be used directly when setting up a call, or entered into the memory for abbreviated dialling.

This feature is of benefit since the international access code varies between CEPT countries, which might cause confusion to a user, and prevent the effective use of abbreviated dialling when roaming internationally. Users may still place international calls conventionally, using the appropriate international access code.

B.1.12 Service Indicator (SI)

An indication is given to the user that there is adequate signal strength (as far as can be judged from the received signal) to allow a call to be made, and that the MS has successfully registered on the selected PLMN. This may be optionally combined with the Country/PLMN Indication (subclause B.1.3).

B.1.13 Autocalling restriction capabilities

See annex A.

B.1.14 Emergency Calls capabilities

See clause 2.

B.1.15 Dual Tone Multi Frequency (DTMF)

The MS shall be capable to initiate DTMF in accordance with specifications GSM 02.03 [2] and GSM 03.14 [11]. Optionally, the MS may provide a suppress function which allows the user to switch off the DTMF function.

B.1.16 Subscription identity management

The IMSI is contained in a SIM, "Subscriber Identity Module". If the SIM is removable by the user, its removal detaches the MS, causing a call in progress to be terminated, and preventing the initiation of further calls (except emergency calls - see GSM 02.30 [7]).

The SIM may be in one of two physical sizes, both of which have identical electrical characteristics. The larger "ID-1 SIM" is generally entered into the ME by the user. The card has a polarization mark (see annex C). The ME shall have an indication of how to obtain correct polarization of the card. The smaller "plug-in SIM" is generally mounted internally within the ME.

B.1.17 On/Off switch

The MS may be provided with a means of switching its power supply on and off. Switch-off shall be "soft", so that on activation, the MS completes the following housekeeping functions: termination of a current call, detach (where applicable) and storing required data in the SIM (see GSM 02.17 [6]) before actually switching off. As far as possible, this procedure should also apply on power failure (e.g. remote switch-off or low battery).

B.1.18 Sub-Address

This feature allows the mobile to append and/or receive a sub-address to a Directory Number, for use in call set-up, and in those supplementary services that use a Directory Number.

B.1.19 Support of encryption A5/1 and A5/2

Provision is made for support of up to 7 different algorithms, and the support of no encryption. It is mandatory for A5/1, A5/2 and non encrypted mode to be implemented on mobile stations. Other algorithms are optional.

B.1.20 Short Message Service Cell Broadcast

The Short Message Service Cell Broadcast enables the mobile station to receive short messages from a message handling system.

The short message service cell broadcast teleservice is described in specification GSM 02.03 [2].

B.1.21 Short Message Service Cell Broadcast DRX

This feature enables a mobile station to save on battery utilization, by allowing the mobile station to not listen during the broadcast of messages the subscriber is not interested in.

B.1.22 Service Provider Indication

When available and the MS is in idle mode, the MS shall indicate the Service Provider name. The Service Provider name is stored in the SIM {(max. 16 characters, including spaces)}. The SIM will indicate two options: (1) indication of Service Provider name in parallel to the indication of the PLMN the MS is registered-to; (2) indication of the Service Provider name alternatively to the indication of the PLMN the MS is registered-to. When roaming, the Service Provider name shall only be indicated in parallel to the PLMN the MS is registered-to. If the MS is unable to display the full name of the Service Provider the name is cut from the tail end. The storage of Service Provider name and choice of option shall be under control of the network operator.

B.1.23 Support of the extended Short message cell broadcast channel

This feature allows a mobile station by supporting of the extended Short message cell broadcast channel to enhance the capacity of the service. The support of the extended channel has low priority, i.e. the MS can interrupt the reading of this channel if idle mode procedures have to be executed.

B.1.24 Support of Additional Call Set-up MMI Procedures

This feature allows the user, through direct MS interaction, or the service provider of the user, to specify the user's preferred emergency call MMI (e.g. 911 for US citizens or 999 for UK citizens) for use in any (i.e. home or visited) PLMN. This would be stored in the SIM and the ME would read this and use any entry of these digits to set up an emergency call. It may be possible to store more than one instance of this field.

B.1.25 Network Identity and Timezone

The feature provides the means for serving PLMNs to transfer current identity, universal time and the local timezone to mobile stations, and for the mobile stations to store and use this information. This enhances roaming by permitting accurate indication of PLMN identities that are either newer than the ME or have changed their name since the ME was sold. Additionally time and timezone information can be utilized by MEs as desired.

The network name time and timezone information will normally be transferred from the network to the ME:

- 1) Upon registering on the network.
- 2) When the MS geographically relocates to a different Local Time Zone.
- 3) When the network changes its Local Time Zone, e.g. between summer and winter time.
- 4) When the network changes its identity.
- 5) At any time during a signalling connection with Mobile Station.

Further details of this feature are described in GSM 02.42.

B.1.26 Ciphering Indicator

The ciphering indicator feature allows the ME to detect that ciphering is not switched on and to indicate this to the user, as defined in GSM 02.09.

The ciphering indicator feature may be disabled by the home network operator setting data in the "administrative data" field (EF_{AD}) in the SIM, as defined in GSM 11.11.

If this feature is not disabled by the SIM, then whenever a connection is in place, which is, or becomes unenciphered, an indication shall be given to the user.

Ciphering itself is unaffected by this feature, and the user can choose how to proceed.

B.1.27 Network's indication of alerting in the MS

This feature provides the means for serving PLMNs to transfer to a Mobile Station an indication that may be used by the MS to alert the user in a specific manner in the following cases:

- mobile terminating call;
- network initiated USSD;
- network initiated Mobile Originated (MO) connection, if the ME supports the "network initiated MO connection" feature.

8 different indications are defined, whether the mobile terminating traffic is a call or USSD or related to the network initiated MO connection procedure. These indications are sent by the network and received by the MS:

- Three of these indications are used as levels, reflecting some kind of urgency : level 0 indicates that the MS shall not alert the user for USSD and remain silent in the case of call, level 2 shall be considered by the MS as more important than level 1 for the purpose of alerting the user.
- The five other indications are used as categories, identifying different types of terminating traffic. The MS shall inform the user in a specific manner for each of these five categories. Nevertheless, the possible forms of the alert (different ringing tones, displayed text, graphical symbols...) is still up to the mobile manufacturer (some forms of alerts can be simultaneously used, e.g. ringing tones and text on the display).

The management of the feature by the MS requires for the handling of categories that:

- the SIM stores for each category an informative text (maximum 25 characters per category) describing the type of terminating traffic associated with the category. This information could be used by the ME when alerting the user (display on the screen). It is necessary for the network operator to be able to change the meaning of each category.
- The user has the ability to set up his/her own association between the type of terminating traffic (identified by each category) and the different types of alert provided by the ME. To help the user in this choice, the ME uses the informative text associated with each category (as stored in the SIM). The ME should keep this association when switched off.

Default settings should also be defined in the ME for the following cases:

- when the ME receives a call, USSD or a request for a network initiated MO connection with no alerting indication;
- when the ME receives a call, USSD or a request for a network initiated MO connection with a category of alerting not defined in the SIM.

These default settings should be separated per type of mobile terminated traffic received (call, USSD or request for a network initiated MO connection).

An ME supporting the feature shall act according to the following points in case of mobile terminating traffic:

- when a mobile terminating traffic is received without any indication (level or category), the ME shall act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic).
- if a level is indicated, the ME shall use an alert enabling the user to differentiate between the three levels;
- if a category is indicated, then:
 - if the SIM used in the ME does not store any information on that feature, the ME shall ignore the category received with any mobile terminating traffic and act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic);
 - if the category is not defined in the SIM, the ME shall act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic);

- if the category is defined in the SIM, the ME shall use the alert associated with this category. In addition, it would be very useful for the user to be notified of the informative text associated with this category (e.g. on the display).

Some interactions between this feature and other services related to alerting are described below:

- the call waiting service has priority on this feature, i.e. the call waiting tone will be played and not the alert derived by this feature. If possible, two different indications should be given to the user (e.g. the call waiting tone and a text on the display indicating call waiting, and in addition a text relative to the type of the new call received);
- the presentation of the calling line identity takes priority on this feature, if it is not possible to display this information and another information related to this feature;
- In case of interaction between this feature and ME specific features to alert the user (e.g. whole silent mode), the user should still be able to differentiate between the different levels or different types of terminating traffic, even if the alert itself may be changed.

B.1.28 Network initiated Mobile Originated (MO) connection

The "Network Initiated Mobile Originated connection" feature allows the network to ask the mobile station to establish a mobile originated connection. The serving PLMN provides the mobile station with the necessary information which is used by the mobile station to establish the connection.

Currently only the network initiated mobile originated call feature is specified. It is mandatory for CCBS ME and is used in the case of a CCBS recall.

B.1.29 Support of Localised Service Area (SoLSA)

The localised service area concept shall give the operator the basis to offer subscribers different services (e.g. tariffs or access rights) depending on the (cell based) location of the subscriber. For SoLSA features see GSM 02.43 [15]).

B.1.30 Support of GPRS encryption

Provision is made for support of up to 7 different algorithms, and the support of no encryption. It is mandatory for a GPRS encryption algorithm and non encrypted mode to be implemented on mobile stations supporting GPRS.

B.2.1 Support of supplementary services

Support of Call Barring and Call Forwarding Supplementary Services is mandatory. Support of other Supplementary Services is optional. Support of Unstructured SS Data, as described in GSM 02.90 [9] and GSM 02.30 [7], is optional.

If defined for a given Supplementary Service, the Functional Signalling shall be used, i.e. Unstructured SS Data signalling shall not be used. If an MS does not support the functional signalling for a given SS, the MS cannot declare that it supports that SS.

B.3.1 Abbreviated dialling

The directory number or part of it is stored in the mobile station together with the abbreviated address. After retrieval the directory number may appear on the display.

Abbreviated dialling numbers stored in the ME or SIM may contain wild characters.

It is permitted to extend the number by adding digits (by means of the keypad, R interface or a second abbreviated, or fixed dialling, number (and/or subaddress)) when setting up a call.

If wild characters are used to indicate missing digits, each wild character shall be replaced for network access or supplementary service operation, by a single digit entered at the keypad. The completed directory number is transmitted on the radio path.

B.3.2 Fixed number dialling

This feature provides a mechanism so that by the use of an electronic lock it is possible to place a bar on calling any numbers other than those pre-programmed in the SIM.

Under control of PIN 2, "Fixed Dialling Mode" may be enabled or disabled. The mode selected is stored in the SIM.

Fixed Dialling Numbers (FDNs) are stored in the SIM in the Fixed Dialling Number field. FDN entries may take the function of an Abbreviated Dialling Number/Supplementary Service Control (ADN/SSC), Overflow and/or sub-address. Fixed Dialling Numbers stored in the SIM may contain wild card characters.

The Fixed Dialling feature is optional, however when Fixed Dialling Mode is enabled, an ME supporting the feature shall:

- Prevent non FDN entries from being called.
- Only allow modification, addition or deletion of Fixed Number Dialling entries under control of PIN2.
- Allow calls to numbers stored as FDN entries.
- Support the reading and substitution of wildcards in any position of an FDN entry, via the ME MMI.
- Allow the user to replace each wildcard of an FDN entry by a single digit, on a per call basis without using PIN2. The digit replacing the wildcard may be used for network access or supplementary service operation.
- Only allow Supplementary Service (SS) Control (in Dedicated or Idle mode) if the SS control string is stored as an FDN entry.
- Allow the extension of an FDN entry by adding digits to the Fixed Dialling number on a per call basis.
- Allow the emergency number (112) to be called, even if it is not an FDN entry.
- Allow normal access to ADN fields (i.e. allow ADN entries to be modified, added or deleted) and the keyboard.
- Allow use of ADNs subject to the FDN filter.

When FDN is disabled, an ME supporting FDN shall:

- Allow FDN entries to be read as though they were normal ADN entries.
- Only allow modification, addition or deletion of Fixed Number Dialling entries under control of PIN2.
- Allow normal access to ADN fields and the keyboard.

If the ME does not support FDN, the MS shall not allow the making or receiving of calls when Fixed Dialling is enabled. However, emergency calls (112 and other user defined emergency numbers) shall still be possible.

NOTE: Wildcards are stored on the SIM. The wildcard coding is given in GSM 11.11.

B.3.3 Barring of Dialed Numbers

This feature provides a mechanism so that by the use of an electronic lock it is possible to place a bar on calling any numbers belonging to a pre-programmed list of numbers in the SIM.

Barred Dialling Numbers stored in the SIM may contain wild characters.

Under control of PIN2, "Barred Dialling Mode" may be enabled or disabled. The selected mode is stored in the SIM.

Under PIN2 control, it shall be possible to add, modify or delete a particular "Barred Dialling Number" (BDN) and to allocate or modify its associated comparison method(s). This BDN may have the function of an abbreviated dialling number / supplementary service control (ADN/SSC), overflow and/or sub-address.

When BDN is inactive, no special controls are specified, and the barred dialling numbers may be read (though not modified or deleted, except under PIN2 control) as if they were normal abbreviated dialling numbers. Access to keyboard and normal abbreviated dialling numbers (including sub-address) is also permitted.

When Barring of Dialed Numbers is active:

- Considering a number dialled by the user, if it exists a BDN for which there is a successful comparison (see below) between that BDN and the dialled number, then the ME shall prevent the call attempt to that number. If there is no BDN to fulfil those conditions, the call attempt is allowed by the ME.

With each BDN is associated one (or a combination of) comparison method(s) used between that BDN and the number dialled by the user. At least three different comparison methods are possible:

- The comparison is made from the first digit of that BDN, from the first digit of the dialled number and for a number of digits corresponding to the length of the BDN.
- The comparison is made from the first digit of that BDN, from any digit of the dialled number and for a number of digits corresponding to the length of the BDN.
- The comparison is made backwards from the last digit of that BDN, from the last digit of the dialled number and for a number of digits corresponding to the length of the BDN.
- If a BDN stored in the SIM contains one or more wild characters in any position, each wild character shall be replaced by any single digit when the comparison between that BDN and the dialled number is performed.
- If a BDN contains a sub-address, and the same number without any sub-address or with that sub-address is dialled, the ME shall prevent the call attempt to that number.
- Numbers specified as "barred" may only be modified under PIN2 control.
- If the ME does not support barring of dialled numbers, the MS shall not allow the making or receiving calls. However, this feature does not affect the ability to make emergency calls.

If "Fixed Number Dialling" and "Barring of Dialed Numbers" are simultaneously active, the dialled number shall be checked against the two features before the ME allows the call attempt. In that case, a dialled number will only be allowed by the ME if it is in the FDN list and if the comparison between that number and any number from the BDN list is not successful.

The MS may support other selective barrings, e.g. applying to individual services (e.g. telephony, data transmission) or individual call types (e.g. long distance, international calls).

B.3.4 DTMF control digits separator

Provision has been made to enter DTMF digits with a telephone number, and upon the called party answering the ME shall send the DTMF digits automatically to the network after a delay of 3 seconds ($\pm 20\%$). The digits shall be sent according to the procedures and timing specified on GSM 04.08 [12].

The first occurrence of the "DTMF Control Digits Separator" shall be used by the ME to distinguish between the addressing digits (i.e. the phone number) and the DTMF digits. Upon subsequent occurrences of the separator, the ME shall pause again for 3 seconds ($\pm 20\%$) before sending any further DTMF digits.

To enable the separator to be stored in the address field of an Abbreviated Dialling Number record in the SIM, the separator shall be coded as defined in GSM 11.11 [14]. The telephone number shall always precede the DTMF digits when stored in the SIM.

The way in which the separator is entered and display in the ME, is left to the individual manufacturer's MMI.

MEs which do not support this feature and encounter this separator in an ADN record of the SIM will treat the character as "corrupt data" and act accordingly.

B.3.5 Selection of directory number in messages

The Short Message (Point to Point MT or MO, or Cell Broadcast), Network Initiated USSD or Network Response to Mobile Originated USSD message strings may be used to convey a Directory Number which the user may wish to call. This can be indicated by enclosing the directory number in a pair of inverted commas (" ").

If the displayed message contains these characters enclosing a directory number, a call can be set up by user action. Normal (unspecified) or International format (using + symbol) may be used.

The message may contain more than one directory number, in which case it is for the user to select the one required.

B.3.6 Last Numbers Dialed (LND)

The mobile station may store the Last "N" Numbers dialled in the SIM and/or the ME. "N" may take the value up to 10 in the SIM. It may be any value in the ME. The method of presentation of these to the user for setting up a call is the responsibility of the MS but if these numbers are stored in both the SIM and the ME, those from the SIM shall take precedence. The security for handling this is defined in GSM 02.17 [6].

B.3.7 ME-SIM lock

This feature controls the ability of the MS to access networks according to whether the ME matches the SIM based on one or more of the following criteria:

- Subscriber identity (IMSI).
- Group identifier level 1 (e.g. Service Provider identity).
- Group identifier level 2.
- PLMN identity (MCC+MNC).

One or more of these criteria may be activated. When any are activated, the ME shall be locked to the SIM such that the MS shall only make network registration attempts when there exists a bit-exact match between corresponding data elements on the ME and SIM for each of the activated criteria.

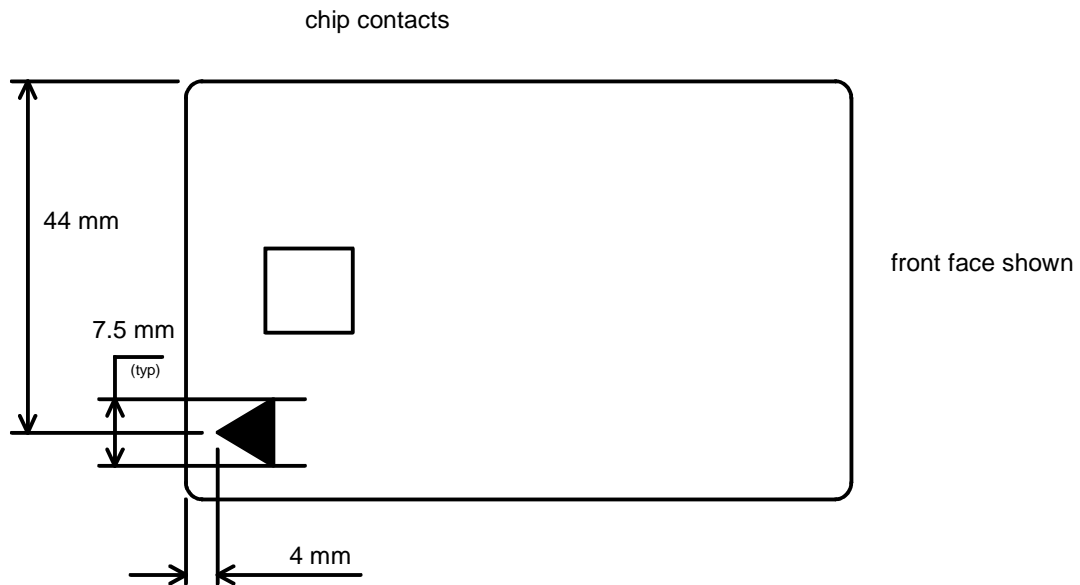
Secure means shall be provided to prevent unauthorized changes to the lock status or the contents of any of the data fields above on the SIM or ME.

B.3.8 Service Dialling Numbers

The Service Dialling Numbers feature allows for the storage of numbers related to services offered by the network operator/service provider in the SIM (e.g. customer care). The user can use these telephone numbers to make outgoing calls, but the access for updating of the numbers shall be under the control of the operator.

NOTE: No MMI is envisaged to be specified for these numbers and it is left to mobile manufacturer implementations.

Annex C (normative): GSM-MoU ID1 SIM layout



NOTE: The symbol may be printed in the same location on the rear as well as the front face.

Annex D (informative): Change history

Change history						
SMG No.	TDoc. No.	CR. No.	Subclause affected	New version		Subject/Comments
SMG#22	304/97	A011	B.3.2	5.3.0		FDN Spec addresses wild card implementation
SMG#22	507/97	A014	Table 1 (1.26) Subclause B.1.26	5.3.0		Introduction of mandatory ciphering indication
SMG#24	971/97	A015	Table 1 "basic MS features" and a new section B1.26 is introduced.	5.4.0	R97	\$(NI Alert in MS)\$: Introduction of the new work item "network's indication of alerting in the MS". With this feature, the user will be able to discriminate between different types of mobile terminated traffic.
SMG#24	972/97	A016	B1.25 was corrected	5.4.0	R96	Alignment of NITZ - Network name, time and timezone information will be transferred from the network to the ME: At any time during a signalling connection with mobile station.
SMG#25				6.0.0		Creation of version 6.0.0 as part of GSM release 1997
SMG#26	98-0317	A017	Introduction, 2, B.1.27, B.1.28 (new) Verify with Anouch Chichmanian, not all referenced sections are there !!	6.1.0	R97	A new mechanism is introduced in Release 97 to allow the network to make the MS initiate a call. As an example, this mechanism is used for CCBS recall. A new MS feature "network initiated MO connection" is therefore added in GMS 02.07 to cover this case and to anticipate future applicability, e.g. to SMS or supplementary services.
SMG#26	98-0317	A018	B.1.27	6.1.0	R97	Extension of the network's indication of alerting in the MS to the new mechanism "network initiated Mobile Originated connection" defined in release 97.
SMG#27	98-0548	A019	1.1, 2, B.1.29 (new)	7.0.0	R98	Addition of the SoLSA feature
SP-07	SP-000060	A027	2, new B.1.xx	7.1.0	R98	Support of encryption in GPRS mobile stations

History

Document history		
V7.0.1	July 1999	Publication
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