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RELEASE NOTE

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Mobile Station Features

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1. Reason for changes

No changes since the previously distributed version.

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Title: MOBILE STATION FEATURES

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0. SCOPE

The purpose of this recommendation is to define mobile station features and to classify them according to their type and whether they are mandatory or optional. The MS features detailed in this Recommendation do not represent an exhaustive list. Those MS features which are subject to Type Approval are described in GSM 11.10.

1. DEFINITION

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.

1.1. Basic MS features

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

1.2. Supplementary MS features

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

1.3. Additional MS features

An additional MS feature is a feature which is neither a basic nor a supplementary feature (e.g. a "loudspeaker").

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).

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. The implementation of optional features is left to the manufacturers' discretion. Implementation of all MS features must be done within the provision of GSM 11.10. 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 order to make a simple and uniform use of MS features possible, independently of the MS type and MS manufacturer, the harmonization of the handling of a minimum set of features is desirable. This minimum set includes at least all mandatory features.

In the following tables 1/GSM 02.07, 2/GSM 02.07 and 3/GSM 02.07 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/GSM 02.07 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).

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.	Subscription Identity Management	M
1.5a.	Invalid PIN Indicator Mandatory in MS but optional in SIM modules	M
1.6.	Keypad	O 1)
1.7.	IMEI	M
1.8.	Short Message	}
1.9.	Short Message Overflow Indication	
1.10.	DTE/DCE Interface	O
1.11.	ISDN 'S' Interface	O
1.12.	Analogue Interface	O
1.13.	International Access Function ("+" key)	O 1)
1.14.	On/Off Switch	O
1.15.	Service Indicator	M*
1.16.	Autocalling restriction capabilities	2)
1.17.	Emergency Calls capabilities	M 3)

Table 1/GSM 02.07: Basic MS features

Descriptions are given in the appendix to GSM 02.07.

* 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 autocalling equipment can be connected, shall be able to restrict repeated call attempts according to the procedures described in Annex 1.

Note 3) Emergency calls shall be possible according to Teleservice 12 (see rec GSM 02.03 and 02.30).

NAME	MANDATORY (M) OPTIONAL (O)
2.1. Charge Indication	O
2.2. Control of Supplementary Services	1)

Note 1) See Appendix, clause 2.2.

Table 2/GSM 02.07: Supplementary MS features

Descriptions are given in the appendix to GSM 02.07.

NAME		MANDATORY (M)
		OPTIONAL (O)
3.1.	Abbreviated Dialling	O
3.2.	Fixed Destination Call	O
3.3.	Number Repetition	O
3.4.	Handsfree Operation	O
3.5.	Barring of Outgoing Calls	O
3.6.	Prevention of Unauthorised Use	O
3.7.	Earpiece Volume Control	O
3.8.	Second Earpiece	O
3.9.	Loudspeaker Operation	O
3.10.	Reception Quality Indicator	O
3.11.	Switch-off Timer	O
3.12.	Self-testing	M
3.13.	External Alarm	O
3.14.	Automatic Switch-on	O
3.15.	Second Handset	O
3.16.	Call Charge Units Meters	O
3.17.	Additional MS-features Display Functions	O
3.18.	Multi User Mobile Station	O

Table 3/GSM 02.07: Additional MS features

Descriptions are given in the appendix to GSM 02.07.

ANNEX 1

Automatic calling repeat call attempt restrictions

A repeat call attempt may be made when a call attempt is unsuccessful for the reasons listed below (as defined in table 10.53 of GSM 04.08 and Appendix H of GSM 04.08).

These reasons are classified in three major categories:

1. "Busy destination":

Cause number 17	User busy
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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 (uncomplete number)
38	Network out of order.

Note: 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 until a manual intervention at the calling apparatus is performed. 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.

<u>Call attempt</u>	<u>Minimum duration between call attempts</u>
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 no further automatic call attempt is allowed.

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.

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

APPENDIX TO RECOMMENDATION GSM 02.07

DESCRIPTION OF MOBILE STATION FEATURES

The paragraph numbers refer to the items in Tables 1, 2 and 3 of GSM 02.07. The implementation (optional or mandatory) is shown in these tables.

1.1. Display of called number

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

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.

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 section 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.

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.

1.5. Subscription Identity Management

The IMSI is contained in a SIM, "Subscriber Identity Module", which is physically secured, and standardised in the GSM system.

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).

Security aspects concerning the SIM are described in GSM 02.09 ; further details concerning the IMSI and the SIM, together with information on PIN management, are described in GSM 02.17.

Specifications for IMSI authentication are to be found in GSM 03.20 and 03.21.

Provision must also be made for interactions between the user and the SIM, e.g. in the case of PIN management, this may be via the MS keypad.

1.5a. Invalid PIN indicator

A display feature to indicate that an invalid PIN has been entered.

1.6. Keypad

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

See also GSM 02.30 (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 1.

1.7. 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 and 03.03. 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.

1.8. 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 services 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 Recommendation GSM 02.03.

1.9. 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.

1.10. DTE/DCE interface

A standard connector for attachment of a DTE to the MS and use in conjunction with data services.

1.11. ISDN 'S' terminal interface

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

1.12. Analogue interface

This interface provides an external analogue connection for equipment such as handsfree equipment.

1.13. 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.

1.14. On/Off switch

The MS may be provided with a means of switching its power supply on and off. Switch-off is generally "soft", so that on activation, the MS completes any housekeeping functions, such as deregistration, before actually switching off. Switch-on may optionally be associated with entering a PIN code.

1.15. Service Indicator

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 (1.3).

2.1. Charge indication

This feature enables the display of charging information provided by the PLMN on a per-call basis.

2.2. Control of Supplementary Services

It is mandatory that Supplementary Services can be controlled from the MS. Procedures for this are defined in GSM 02.30.

In addition to these specified MMI procedures the MS may be equipped with optional additional enhanced MMI procedures for control or display.

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. An incomplete directory number must be supplemented by means of the keypad function or a second stored number. The directory number is transmitted on the radio path.

3.2. Fixed number call

This feature implies 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 mobile station. There may be two subcategories to this service :

- All calls are made to only one predetermined number.
- Calls may be made to several predetermined numbers. The required number is selected by means of an abbreviated address code.

- Subaddresses may be added to the predetermined number.

In both cases the actual directory number is transmitted on the radio path.

3.3. Number repetition

This feature enables a single repetition, upon manual activation, of the call set-up procedure with the last directory number being shown on the display.

3.4. Handsfree operation

This feature enables a telephone conversation without using a handset. Measures against self-oscillation and echo transmission to the remote subscriber have to be taken in the MS. As an additional refinement, control of the MS may be by voice input, possibly with audible responses from the MS.

3.5. Barring of outgoing calls

This feature as distinct from the supplementary service of the same name allows outgoing calls to be blocked. The barring condition may be activated/deactivated by using a key, key-word etc (Exception: transmission of emergency calls).

The barring may be selective, i.e. applied to individual services (e.g. telephony, data transmission), individual call types (e.g. long-distance, international calls) or supplementary services. No network signalling involved.

3.6. Prevention of unauthorised use

The station can only be operated in the presence of a valid IMSI. (Exception: emergency calls. OD). Stations may be able to be locked, allowing use only by means such as entering a key, PIN etc.

3.7. Earpiece volume control

This feature enables the subscriber to adjust the received audio level of the earpiece.

3.8. Second earpiece

A second earpiece may be connected allowing another person to listen in on a conversation via an ordinary telephone set. The volume may be controlled.

3.9. Loudspeaker operation

This feature enables a third person to listen in on a telephone conversation by means of a loud-speaker. Measures against self-oscillation and echo transmission to the remote subscriber have to be taken in the MS. The volume may be controlled.

3.10. Switch-off timer

After, for example, the car engine has been switched off, the MS is automatically switched off by the switch off timer - after a given delay (e.g. 2 hours).

3.12. Self testing

After switching on the power supply and before the first connection to the network the MS shall carry out self-testing to control its readiness for operation, as described in GSM 11.10.

For the duration of this self-testing it must be ensured that neither one's own nor other networks are disturbed or influenced by the MS. Therefore during self-testing the transmitter must not radiate.

If an error in the equipment is identified during self-testing the MS has to indicate this.

3.13. External alarm facility

A provision which enables to transfer ringing control signals from incoming calls to an external device (e.g. acoustical or optical) to be activated by an off/on switch.

Note: In some countries this may be illegal.

3.14. Automatic switch-on

After the car engine has been switched on, the MS is automatically switched on if the MS was in the on-state before the car engine had been switched off.

3.15. Second handset

A second handset (telemicrophone with control facility) can be connected to the MS. This second handset should have the same facilities as the main handset. It should be possible to switch independently between the two handsets.

3.16. Call charge units meter

The mobile station may incorporate a call charge units indicator. This call charge indicator would give information about the actual call charge units consumed.

The call charge indicator would have the following separate counters:

- last conversation counter
- cumulative counters for each PLMN

The following information would on command be shown in the normal mobile station display on two different display locations at the same time :

- a) counter information on last conversation
- b) counter information on cumulation.

3.17. Additional MS features display functions

Additional display functions may be incorporated in the MS at manufacturer's discretion.

3.18. Multi user mobile station

A multi user mobile station (MUMS) is a mobile station rendering service not only to its permanent user but also temporarily to other subscribers, giving full access to services in a GSM PLMN both in the outgoing and incoming direction.

This type of MS provides a separate card reader for each subscriber card. Thus MUMS consists of at least two with no limitation of further additional card readers. The number of card readers determines the maximum number of "simultaneous" subscribers eventually using the MS. The subscriber activates "his" MS by the same procedure as it is done at the single card reader MS.

If the MUMS is busy by one subscriber, another call to another subscriber having registered by means of that MUMS cannot reach him although he is not busy. No information/signalling other than that normally provided in the case of an unavailable subscriber will be given to the calling or called party about that situation.