EUROPEAN
TELECOMMUNICATION
STANDARD

ETS 300 505

January 1998

Third Edition

Source: SMG

Reference: RE/SMG-010207PR1

ICS: 33.020

Key words: Digital cellular telecommunications system, Global System for Mobile communications (GSM)

**GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS**

Digital cellular telecommunications system (Phase 2);
Mobile Stations (MS) features
(GSM 02.07 version 4.8.2)

ETSI

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS defines typical Mobile Station features (MS) used within the digital cellular telecommunications system (Phase 2) and corresponds to GSM technical specification GSM 02.07 version 4.8.2.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE Rules.

Transposition dates	
Date of adoption of this ETS:	5 December 1997
Date of latest announcement of this ETS (doa):	30 April 1998
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 October 1998
Date of withdrawal of any conflicting National Standard (dow):	31 October 1998

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1 Scope

The purpose of this European Telecommunication Standard (ETS) is to define Mobile Station (MS) features and to classify them according to their type and whether they are mandatory or optional. The MS features detailed in this ETS do not represent an exhaustive list. Those MS features which are subject to Type Approval are described in GSM 11.10.

1.1 Normative references

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

[1]   GSM 01.04 (ETR 100): "Digital cellular telecommunications system (Phase 2); Abbreviations and acronyms".

[2]   GSM 02.03 (ETS 300 502): "Digital cellular telecommunications system (Phase 2); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[3]   GSM 02.04 (ETS 300 503): "Digital cellular telecommunications system (Phase 2); General on supplementary services".

[4]   GSM 02.11 (ETS 300 507): "Digital cellular telecommunications system (Phase 2); Service accessibility".

[5]   GSM 02.16 (ETS 300 508): "Digital cellular telecommunications system (Phase 2); International Mobile station Equipment Identities (IMEI)".

[6]   GSM 02.17 (ETS 300 509): "Digital cellular telecommunications system (Phase 2); Subscriber identity modules Functional characteristics".

[7]   GSM 02.30 (ETS 300 511): "Digital cellular telecommunications system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[8]   GSM 02.40 (ETS 300 512): "Digital cellular telecommunications system (Phase 2); Procedures for call progress indications".

[9]   GSM 02.90 (ETS 300 625): "Digital cellular telecommunications system (Phase 2); Stage 1 description of Unstructured Supplementary Service Data (UUSD)".

[10]   GSM 03.03 (ETS 300 523): "Digital cellular telecommunications system (Phase 2); Numbering, addressing and identification".

[11]   GSM 03.14 (ETS 300 532): "Digital cellular telecommunications system (Phase 2); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".

[12]   GSM 04.08 (ETS 300 557): "Digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3 specification".

[13]   GSM 11.10 (ETS 300 607): "Digital cellular telecommunications system (Phase 2); Mobile Station (MS) conformity specification".

[14]   GSM 11.11 (ETS 300 608): "Digital cellular telecommunications system (Phase 2); Specification of the Subscriber Identity Module-Mobile Equipment (SIM-ME) interface".

1.2 Definitions and abbreviations

For the purposes of this ETS, the following 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 this ETS are listed in GSM 01.04.

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. 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 "0".

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 DRX	O	
1.21	Service Provider Indication	O	
1.22	Ciphering Indicator	M*	

Descriptions are given in the 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 and 02.30). 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.

Table 2: Supplementary MS features

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

NOTE 1:   See annex B.

Descriptions are given in the annex B.

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 Outgoing Calls	O
3.4	DTMF Control Digits Separator	O
3.5	Selection of Directory No in Short Messages	O
3.6	Last Numbers Dialled	O

Descriptions are given in the annex B.

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).

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: 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: 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.

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 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.

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.

B.1.5 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

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 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.

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 GSM 02.03.

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 (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 GSM 02.03 and 03.14. 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).

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) 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 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.1.21   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.1.22   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.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 and 02.30, 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 shall still be possible.

NOTE: Wildcards are stored on the SIM. The wildcard coding is given [14].

B.3.3   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.

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 (± 20 %). The digits shall be sent according to the procedures and timing specified in GSM 04.08.

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 (± 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. 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 short messages

The Short Message (Point to Point MT or MO, or Cell Broadcast) 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 Dialled (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.

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

chip contacts

44 mm

7.5 mm
(typ)

4 mm

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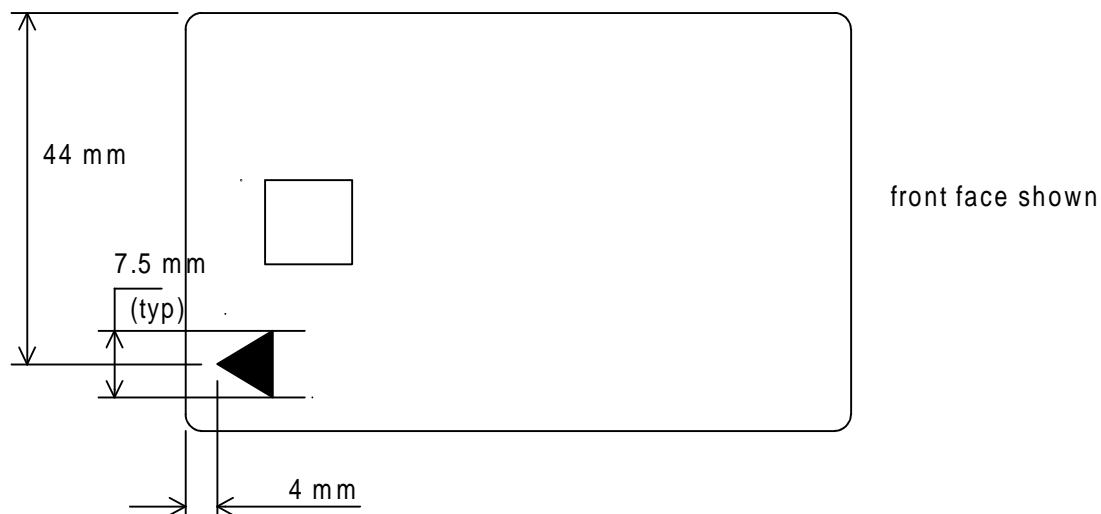
NOTE: The symbol may be printed in the same location on the rear as well as the front face.

Annex D (informative):   Change history

Change history					
SMG No.	**TDoc. No.**	**CR. No.**	**Section affected**	**New version**	**Subject/Comments**
SMG#22	507/97	A012	Table 1 add B.1.22	4.8.0	Introduce mandatory Ciphering Indication
SMG#22	304/97	A013	B.3.2	4.8.0	FDN, Clarify spec and address wildcard

History

Document history			
October 1993	Public Enquiry	PE 51:	1993-11-01 to 1994-02-25
July 1994	Vote	V 61:	1994-07-27 to 1994-09-30
September 1994	First Edition		
August 1995	Unified Approval Procedure (Second Edition)	UAP 33:	1995-08-07 to 1995-12-01
January 1996	Second Edition		
July 1997	One-step Approval Procedure (Third Edition)	OAP 9747:	1997-07-21 to 1997-11-28
January 1998	Third Edition		