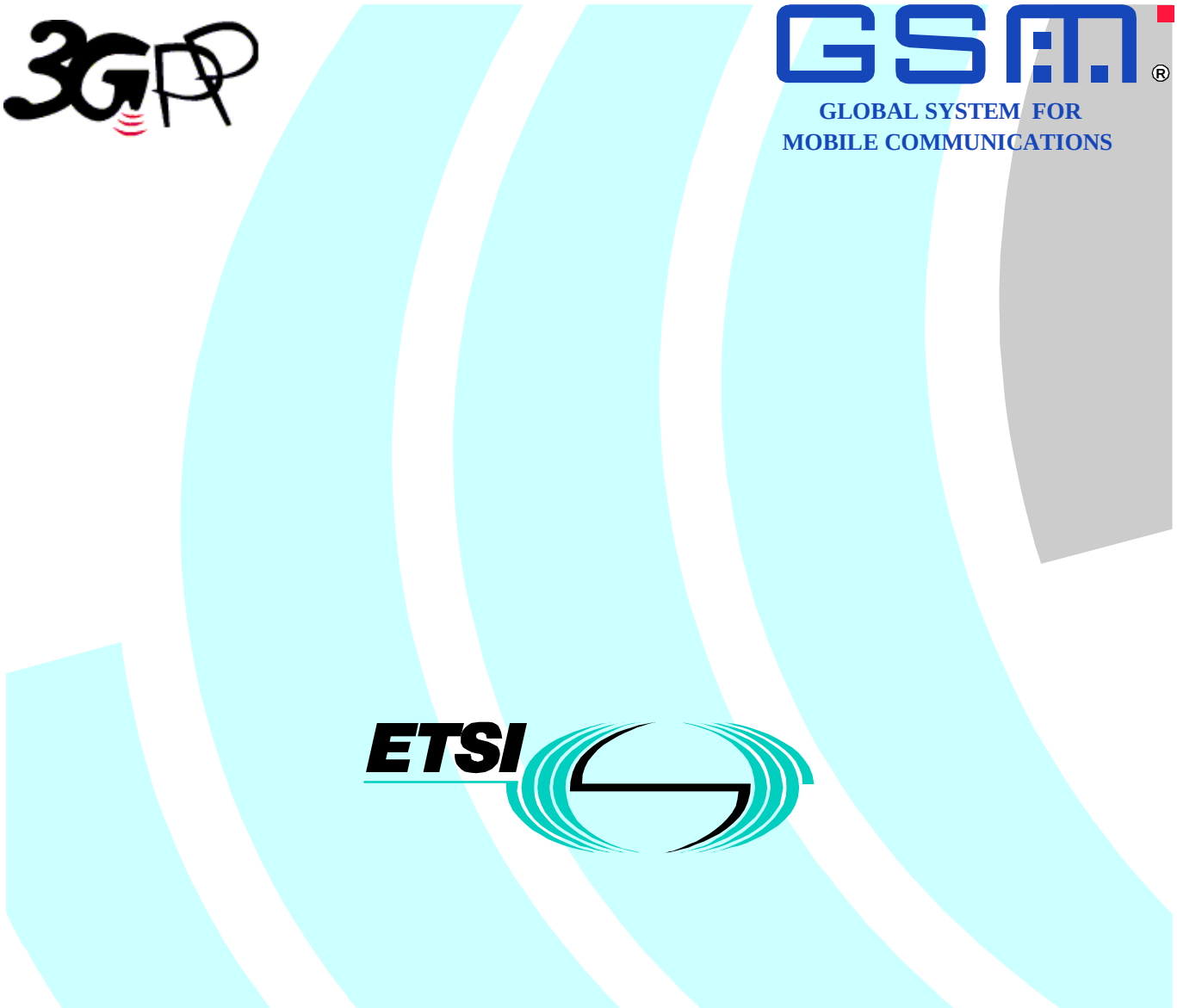
ETSI TS 144 057 V4.0.0 (2001-03)

Technical Specification

**Digital cellular telecommunications system (Phase 2+);
GSM Cordless Telephony System (CTS), Phase 1;
CTS supervising system Layer 3 Specification
(3GPP TS 44.057 version 4.0.0 Release 4)**



Reference
RTS/TSGN-0144057Uv4

Keywords
GSM

ETSI

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under www.etsi.org/key .

Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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

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1 Scope

The present document specifies the procedures used at the CTS system interface with the supervision part i.e. the interface between the CTS-FP and the CTS-SN.

Only CTS regular supervising procedures are described; FMC management is not intended to be standardised.

The present document does not specify the transmission layer but only the layer 3.

When the notations for "further study" or "FS" or "FFS" are present in the present document they mean that the indicated text is not a normative portion of the present document.

The structured functions and procedures of this protocol and the relationship with other layers and entities are described in general terms in GSM 04.07.

1.1 Scope of the Technical Specification

The procedures currently described in the present document are for supervising management over the CTS-FP/CTS-SN interface.

1.2 Application to the interface structures

The layer 3 procedures apply to the interface structures defined in GSM 04.03. GSM 04.07 gives the general description of layer 3 including procedures, messages format and error handling.

1.3 Structure of layer 3 procedures

A building block method is used to describe the layer 3 procedures.

The basic building blocks are "elementary procedures" provided by the protocol control entities.

Complete layer 3 transactions consist of specific sequences of elementary procedures. The term "structured procedure" is used for these sequences.

1.4 Test procedures

Test procedures of the CTS / Fixed Network interface signalling are described in the GSM 11.56 series.

1.5 Transmission layer

The transmission layer is out of scope of the present document. One implementation could be a V.22bis modem with an HDLC based protocol.

1.6 Overview of control procedures

1.6.1 List of procedures

The following procedures are specified in the present document:

Section 4 specifies elementary procedures for CTS Supervising Management

- CTS-FP initialisation procedure (subclause 4.4.1)

- CTS-FP de-initialisation procedure (subclause 4.4.5)
- CTS enrolment procedure (subclause 4.4.2)
- CTS de-enrolment procedure (subclause 4.4.6)
- CTS operation data update procedure (subclause 4.4.3)
- CTS information request procedure (subclause 4.4.4)
- CTS FP authentication procedure (subclause 4.4.7)
- CTS MS authentication procedure (subclause 4.4.8)

The elementary procedures can be combined to form structured procedures. Examples of such structured procedures are given in section 5. This part of the Technical Specification is only provided for guidance to assist implementations.

Section 6 specifies actions to be taken on various error conditions and also provides rules to ensure compatibility with future enhancements of the protocol.

1.7 Applicability of implementations

The applicability of procedures of the present document for the fixed part is dependent on the services and functions which are to be supported by a fixed part.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] GSM 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

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

[3] GSM 02.02: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

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

[5] GSM 02.09: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[6] GSM 02.11: "Digital cellular telecommunications system (Phase 2+); Service accessibility".

[7] GSM 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber identity modules Functional characteristics".

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

[9] GSM 03.01: "Digital cellular telecommunications system (Phase 2+); Network functions".

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

[11] GSM 03.13: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".

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

[13] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[14] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode".

[15] GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[16] GSM 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".

[17] GSM 04.04: "Digital cellular telecommunications system (Phase 2+); layer 1 General requirements".

[18] GSM 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".

[19] GSM 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[20] GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".

[21] GSM 04.10: "Digital cellular telecommunications system ; Mobile radio interface layer 3 Supplementary services specification General aspects".

[22] GSM 04.11: "Digital cellular telecommunications system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[23] GSM 04.12: "Digital cellular telecommunications system (Phase 2+); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[24] GSM 04.80: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification Formats and coding".

[25] GSM 04.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 3".

[26] GSM 04.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 3".

[27] GSM 04.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[28] GSM 04.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 3".

[29] GSM 04.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 3".

[30] GSM 04.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 3".

[31] GSM 04.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 3".

[32] GSM 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[33] GSM 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[34] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[35] GSM 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

[36] GSM 07.01: "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[37] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[38] GSM 09.07: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[39] GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".

[40] GSM 11.21: "Digital cellular telecommunications system (Phase 2); The GSM Base Station System (BSS) equipment specification".

[41] ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".

[42] ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[43] ISO 8348 (1987): "Information processing systems - Data communications - Network service definition".

[44] CCITT Recommendation E.163: "Numbering plan for the international telephone service".

[45] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[46] CCITT Recommendation E.212: "Identification plan for land mobile stations".

[47] ITU-T Recommendation F.69 (1993): "Plan for telex destination codes".

[48] CCITT Recommendation I.330: "ISDN numbering and addressing principles".

[49] CCITT Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".

[50] CCITT Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".

[51] ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".

[52] CCITT Recommendation T.50: "International Alphabet No. 5".

[53] CCITT Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".

[54] CCITT Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".

[55] CCITT Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[56] CCITT Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[57] CCITT Recommendation V.23: "600/1200-baud modem standardized for use in the general switched telephone network".

[58] CCITT Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[59] CCITT Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[60] CCITT Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[61] CCITT Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[62] CCITT Recommendation X.21: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks".

[63] CCITT Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[64] CCITT Recommendation X.28: "DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country".

[65] CCITT Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based data terminal equipments (DTEs) by an integrated services digital network (ISDN)".

[66] CCITT Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

[67] CCITT Recommendation X.32: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network".

[68] CCITT Recommendation X.75 (1988): "Packet-switched signalling system between public networks providing data transmission services".

[69] CCITT Recommendation X.121: "International numbering plan for public data networks".

[70] ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[71] ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[72] ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding.

[73] GSM 02.56: "Digital cellular telecommunications system (Phase 2+); GSM-CTS; Service Description; Stage 1".

[74] GSM 03.56: "Digital cellular telecommunications system (Phase 2+); GSM-CTS; Service Description; Stage 2".

[75] GSM 03.52: "Digital cellular telecommunications system (Phase 2+); GSM-CTS; Overall description of the CTS radio interface; Stage 2".

[76] GSM 03.20 Annex E: "Digital cellular telecommunications system (Phase 2+); GSM-CTS; Security related network functions; Stage 2".

[77] GSM 04.56: "Digital cellular telecommunications system (Phase 2+); GSM-CTS;CTS radio interface layer 3 specification; Stage 3".

3 Definitions, abbreviations and Random values

3.1 Definitions

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

initialised Fixed Part: Fixed Part which have been supplied with the necessary data to provide CTS service on the CTS radio interface. The CTS-FP initialisation procedure is performed at the Fixed Part installation and can be performed whenever the Fixed Part have been de-initialised.

de-initialised Fixed Part: Fixed Part which does not contain the required data to offer CTS service. A de-initialised Fixed Part cannot offer any service.

enrolled Mobile Station: Mobile Station is said to be enrolled on a Fixed Part if it has exchanged some data with this Fixed Part enabling attachement (e.g.in order to perform outgoing calls).

de-enrolled Mobile Station: Mobile Station that is no more known by the Fixed Part.

CTS radio interface: Radio interface between the Mobile Station and the Fixed Part.

3.2 Abbreviations

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

3.3 Random values

In a number of places in the present document, it is mentioned that some value must take a "random" value, in a given range, or more generally with some statistical distribution.

It is required that there is a low probability that two equipments in the same conditions (including the case of two equipments of the same type from the same manufacturer) will choose or get the same value.

4 CTS supervising management procedures

4.1 General

CTS supervising management procedures include the functions related to the management of the CTS system by the CTS operator. These functions are based on:

- radio control: the control of the radio parameters used on the CTS radio interface;
- security control: including subscription checking, CTS authentication (the authentication of the CTS subscriber identity by the CTS Service Node and the authentication of the signature issued by the Service Node by the Fixed Part), GSM authentication (authentication of the Mobile Station by the GSM operator through the Service Node) and administrative data management.

All the CTS supervising procedures can only be performed if a CTS-FP/CTS-SN connection has been established between the fixed part and the service node. If no CTS-FP/CTS-SN connection is currently established, the CTS supervising layer has to initiate such establishment.

As in most cases, the CTS-SN has no means of addressing the CTS-FP, it is assumed that the CTS procedures can only be started by the fixed part. CTS procedures initiated by the Service Node follow a procedure started by the Fixed Part.

4.2 CTS-SPM procedures

All CTS-SPM procedures can only be initiated if a CTS-FP/CTS-SN connection is established.

The procedures initiated by the Fixed Part are:

- CTS-SPM initialisation procedure;
- CTS-SPM enrolment procedure;
- CTS-SPM de-enrolment indication procedure;
- CTS-SPM operation data update procedure.

The procedures initiated by the Service Node (following a procedure started by the Fixed Part) are:

- CTS-SPM de-initialisation procedure;
- CTS-SPM de-enrolment procedure;
- CTS-SPM FP authentication procedure;
- CTS-SPM MS authentication procedure;
- CTS-SPM signature mode setting procedure;
- CTS-SPM operation data inform procedure.

4.3 CTS-SPM states

4.3.1 CTS-SPM states at the Fixed Part

1. IDLE

The CTS-SPM state is not active.

2. WAIT FOR CTS-FP/CTS-SN CONNECTION

The CTS-SPM has requested the establishment of a CTS-FP/CTS-SN connection.

3. CTS-SPM CONNECTION ACTIVE

A CTS-SPM connection is active. Only one CTS-SPM connection can be active at a time.

4. CTS-SPM INITIALISATION INITIATED

The CTS-FP initialisation procedure has been started at the Fixed Part.

5. CTS-SPM ENROLMENT INITIATED

The enrolment procedure has been started at the Fixed Part.

6. CTS-SPM OPERATION DATA UPDATE INITIATED

The operation data update procedure has been started at the Fixed Part.

Only one CTS-SPM connection can be active at a time on the Fixed Part. Nevertheless, an active CTS-SPM connection does not preclude having active CTS-RR and CTS-MM active connection on the CTS radio interface.

4.3.2 CTS-SPM states at the Service Node

1. CTS-SPM DE-INITIALISATION INITIATED

The CTS-FP de-initialisation procedure has been started by the Service Node.

2. CTS-SPM DE-ENROLMENT INITIATED

The de-enrolment procedure has been started by the Service Node.

3. CTS-SPM INFORMATION DATA INITIATED

The information data request procedure has been started by the Service Node.

4. CTS-SPM FP AUTHENTICATION INITIATED

The FP authentication procedure has been started by the Service Node.

5. CTS-SPM MS AUTHENTICATION INITIATED

The MS authentication procedure has been started by the Service Node.

4.4 CTS-SPM common procedures

4.4.1 CTS-FP initialisation procedure

The purpose of the CTS-FP initialisation procedure is to provide the fixed part with the necessary data to enable CTS service.

The CTS-FP initialisation procedure is always initiated by the CTS-FP.

4.4.1.1 CTS-FP initialisation initiation

The fixed part initiates the CTS-FP initialisation procedure by sending a CTS-SPM INITIALISATION REQUEST message to the CTS-SN and starts the timer T_init_FP.

The CTS-SPM INITIALISATION REQUEST message specifies the fixed part identity, and the classmark of the fixed part.

The CTS-SPM INITIALISATION REQUEST message is sent on the CTS-FP/CTS-SN interface following a CTS-FP/CTS-SN connection initiated by the CTS fixed part.

4.4.1.2 CTS-FP initialisation completion

If the CTS-FP initialisation can be performed, the service node shall send a CTS-SPM INITIALISATION ACCEPT to the fixed part. This message includes the necessary radio parameters to enable operation on the CTS interface. These data are associated to timers that are also sent in the message. The validity period (Tval) timer indicates the maximum duration where those data should be used. The recall period (Trecal) requires the fixed part to contact the service node on a regular basis. The recall period should enable the fixed part to update the necessary data before the validity period expires. If Tval and Trecal are not included in the CTS-SPM INITIALISATION ACCEPT message, their values are considered as being infinite.

Upon reception of this message, the fixed part stops the timer T_init_FP.

The service node shall send a CTS-SPM INITIALISATION REJECT if the rights are not verified.

When, the fixed part has received and accepted the necessary data in order to operate, it sends a CTS-SPM INITIALISATION COMPLETE to the service node.

4.4.2 CTS enrolment procedure

The enrolment of a mobile station onto a fixed part is the procedure by which a mobile and a fixed part are made known to each other in order that the CTS service can be provided to the mobile station. This procedure can be performed under the control of the CTS operator depending on the information downloaded by the operator at subscription setting. The enrolment procedure performed locally between the mobile station and the fixed part is described in GSM 04.56.

If required by the CTS operator, the additional CTS-SPM enrolment procedure should be performed.

The CTS-SPM enrolment procedure is initiated by the fixed part following a successful first part local enrolment procedure.

4.4.2.1 CTS-SPM enrolment initiation

The fixed part initiates the CTS-SPM enrolment procedure by sending the message CTS-SPM ENROLMENT REQUEST message and starting a timer T_enrol_FP.

The CTS-SPM ENROLMENT REQUEST message specifies the fixed part identity and the mobile identity.

4.4.2.2 CTS enrolment completion

If the service node agrees to enrol the mobile onto the fixed part, the service node sends a CTS-SPM ENROLMENT ACCEPT message. This message may include an enrolment validity time; if this information element is not included in the message, the enrolment validity period is considered as being infinite.

Similarly, the service node shall send a CTS-SPM ENROLMENT REJECT if the request cannot be granted with the reject cause. Upon reception of CTS-SPM ENROLMENT ACCEPT or CTS-SPM ENROLMENT REJECT message, the fixed part stops timer T_enrol_FP.

4.4.3 CTS operation data update procedure

The purpose of the CTS operation data update procedure is to provide the fixed part with the necessary data to operate. Before performing the operation data update procedure the fixed part has to be initialised.

This procedure is launched by the fixed part at the expiry of timer Trecal. The duration of Trecal is defined by the service node during the CTS-FP initialisation procedure.

4.4.3.1 CTS operation data update initiation

The fixed part initiates the CTS operation data update procedure by sending the message CTS-SPM OPERATION DATA REQUEST message and starting timer T_opdata_FP.

4.4.3.2 CTS operation data update completion

The service node sends the required data in a CTS-SPM OPERATION DATA DELIVER message. Upon reception of this message the fixed part stops timer T_opdata_FP.

The sent operation data are associated to 2 timers. The validity period (Tval) timer indicates the maximum duration where those data should be used. The recall period (Trecal) requires the fixed part to contact the service node on a regular basis. The recall period should enable the fixed part to update the necessary data before the validity period expires. If Tval and Trecal are not included in the CTS-SPM OPERATION DATA DELIVER message, there value are considered as being inifinite.

If the data are accepted by the fixed part, the fixed part shall send a CTS-SPM OPERATION DATA ACCEPT to the service node and shall launch the timers Tval and Trecal related to the corresponding data, if the application time Tapplic information element is set to "apply immediately". Otherwise, the fixed part stores the new operation data and starts timer Tapplic. At Tapplic expiry, the fixed part applies the new operation data and starts the associated timers Tval and Trecal.

Similarly, the fixed part shall send CTS-SPM OPERATION DATA REJECT if the data cannot be accepted (i.e. the fixed part did not succeed in authenticating the signature issued by the service node).

4.4.4 CTS Information data request procedure

In some cases the service node may require to be informed of the data used by fixed part. The CTS Information data procedure can be initiated during any procedure started by the fixed part (e.g. enrolment procedure, operation data update procedure).

4.4.4.1 CTS Information data request

The service node initiates the CTS information data request procedure by sending a CTS-SPM INFORMATION DATA REQUEST message to the fixed part.

Upon receipt of the CTS-SPM INFORMATION DATA REQUEST message the fixed part collects the required data.

4.4.4.2 CTS Information data response

The fixed part sends a CTS-SPM INFORMATION DATA RESPONSE to the service node including these data.

4.4.5 CTS-FP de-initialisation procedure

The purpose of the CTS-FP de-initialisation procedure is to allow the CTS operator to de-initialise a given fixed part. As the fixed part has no means to address a given fixed part, this procedures follows another procedure initiated by the fixed part.

4.4.5.1 CTS-FP de-initialisation initiation

The service node initiates the CTS-FP de-initialisation procedure by sending a CTS-SPM DE-INITIALISATION REQUEST message to the fixed part and starts the timer T_deinit_SN. Upon receipt of the CTS-SPM DE-INITIALISATION REQUEST message the fixed part stops operation.

4.4.5.2 CTS de-initialisation completion

As a response to the message the fixed part sends a CTS-SPM DE-INITIALISATION COMPLETE message.

If the fixed part does not accept the de-initialisation command (i.e. the fixed part did not succeed in authenticating the signature issued by the service node) it sends a CTS-SPM DE-INITIALISATION REJECT message to the service node. Upon reception of either CTS-SPM DE-INITIALISATION COMPLETE or CTS-SPM DE-INITIALISATION REJECT, the service node stops timer T_deinit_SN.

4.4.6 CTS-SPM de-enrolment procedure

The CTS-SPM de-enrolment of a mobile from a fixed part can be initiated either by the fixed part or by the service node.

4.4.6.1 CTS-SPM de-enrolment initiated by the fixed part

If the CTS-SPM de-enrolment procedure is initiated by the fixed part, the fixed part informs the service node of the mobile de-enrolment if specified by the operator at subscription setting, by sending a CTS-SPM DE-ENROLMENT INDICATION.

If the de-enrolment is initiated by the service node, the following procedure applies.

4.4.6.2 CTS-SPM de-enrolment initiated by the service node

The service node initiates the CTS-SPM de-enrolment procedure by sending a CTS-SPM DE-ENROLMENT REQUEST command to the fixed part including the mobile identity.

Upon reception of the de-enrolment message, the fixed part performs de-enrolment of the specified mobile and responds by sending a CTS-SPM DE-ENROLMENT COMPLETE.

4.4.7 CTS FP authentication procedure

The purpose of the fixed part authentication procedure is twofold:

First to permit the network to check whether the identity provided by the fixed part is acceptable or not.

Second to provide parameters enabling the service node and the fixed part to calculate the signature key.

The cases where the authentication procedure should be used are defined in GSM 03.56.

The fixed part authentication procedure is always initiated and controlled by the CTS operator.

4.4.7.1 CTS FP authentication request

The service node initiates the CTS FP authentication procedure by sending a CTS-SPM FP AUTHENTICATION REQUEST message to the fixed part and starting timer T_FPauth_SN.

Upon receipt of the CTS-SPM FP AUTHENTICATION REQUEST message the fixed part calculates the response (cf. GSM 03.20 Annex E).

4.4.7.2 CTS FP authentication response

The fixed part processes a challenge response and sends it to the service node in a CTS-SPM FP AUTHENTICATION RESPONSE message. Upon reception of this message, the service node stops timer T_FPauth_SN.

If the FP authentication fails the service node replies with a CTS-SPM FP AUTHENTICATION REJECT message.

4.4.8 CTS MS authentication procedure

Mobile authentication can be performed if required by the CTS operator. The procedure is similar to the GSM authentication procedure and aims to authenticate the mobile subscriber identity (the ciphering key is not required as no encryption applies through the CTS-FP/CTS-SN interface).

The mobile authentication procedure is always initiated and controlled by the service node.

4.4.8.1 CTS MS authentication request

The service node initiates the mobile authentication procedure by sending a CTS-SPM MS AUTHENTICATION REQUEST message to the fixed part and starts timer T_MSauth_SN. The fixed part acts as a relay and sends that request message to the mobile station.

4.4.8.2 CTS MS authentication response

When the challenge response is transmitted from the mobile to the fixed part in a procedure described in GSM 04.56, the fixed part sends it to the service node in a CTS-SPM MS AUTHENTICATION RESPONSE message. The service node stops timer T_MSauth_SN.

If the authentication fails the service node replies with a CTS-SPM MS AUTHENTICATION REJECT message.

5 Examples of structured procedures

Section 5 is informative.

5.1 CTS-FP Initialisation

The CTS-FP initialisation procedure is always initiated by the fixed part.

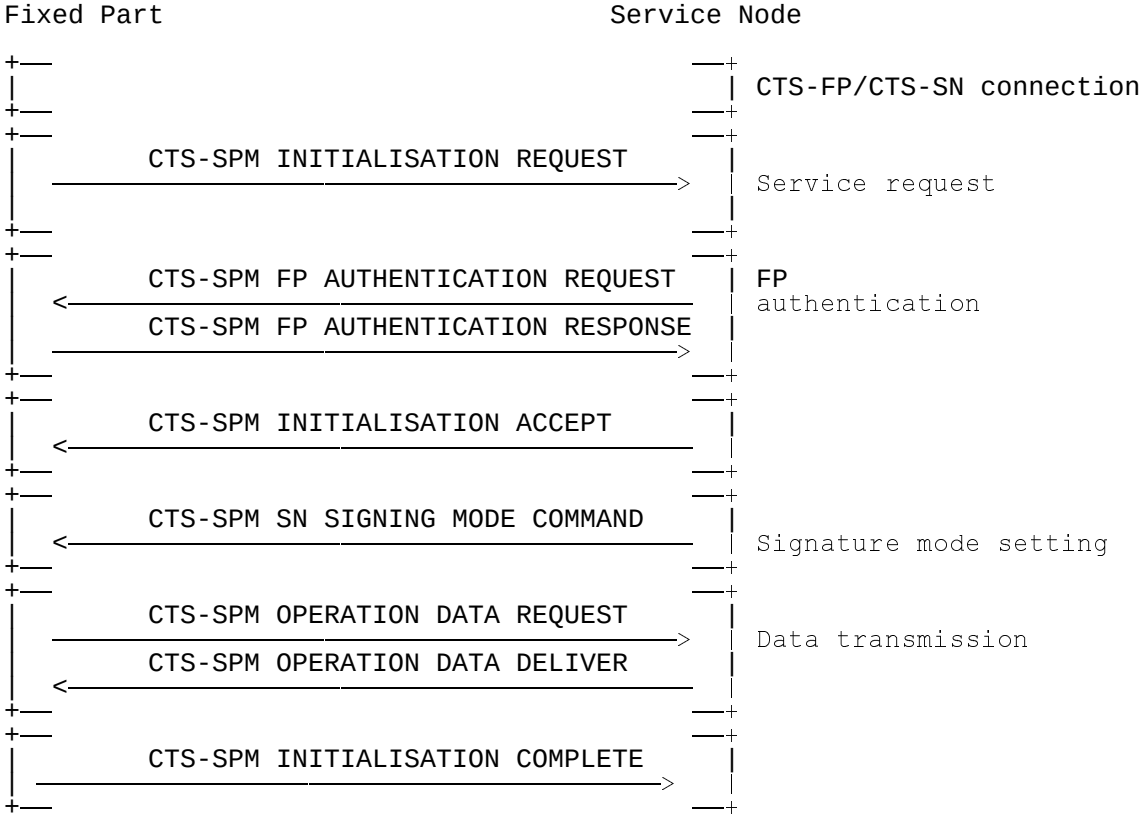

Figure 5.1/GSM 04.xx: CTS-FP initialisation

5.2 CTS-SPM Enrolment

The CTS-SPM enrolment procedure is always initiated by the fixed part following an initiation by the mobile station.

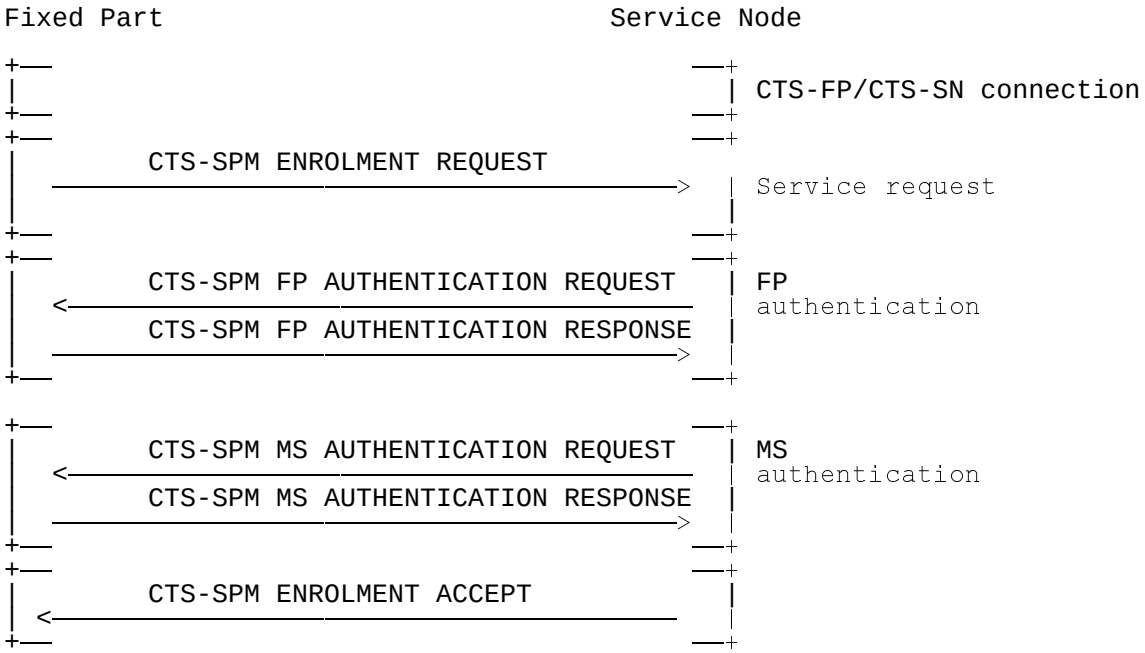

Figure 5.2/GSM 04.xx: CTS-SPM Enrolment

5.3 Operation data update

The operation data update procedure is always initiated by the fixed part.

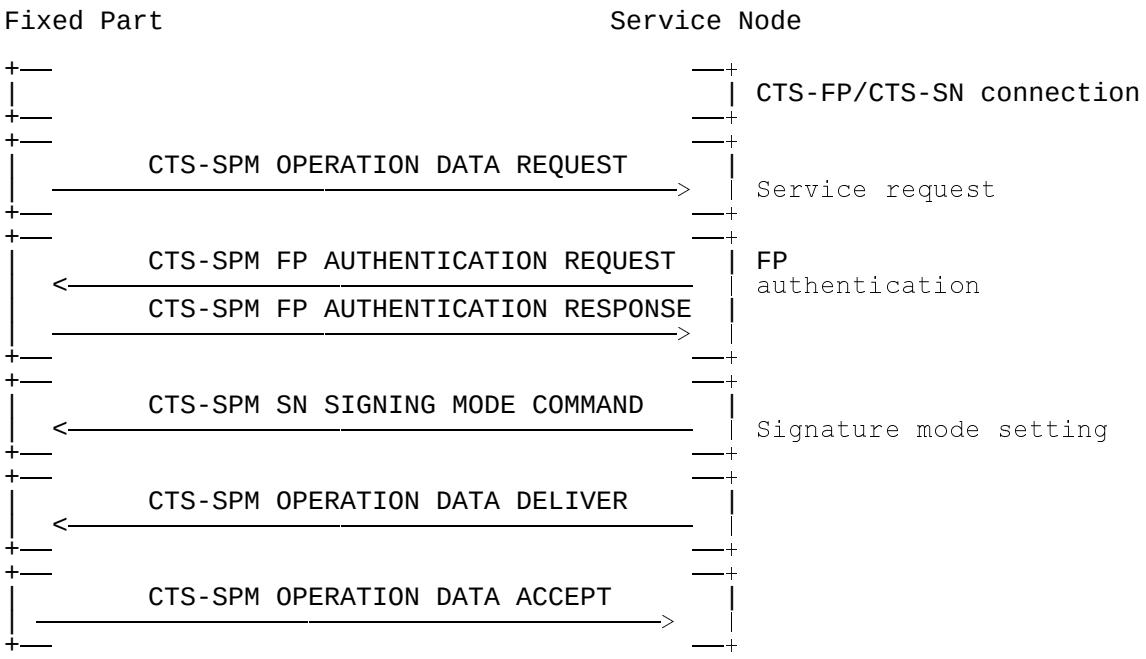

Figure 5.3/GSM 04.xx: CTS operation data update

5.4 Information request

The information request procedure is always initiated by the service node (the CTS-FP/CTS-SN connection is initiated by the fixed part).

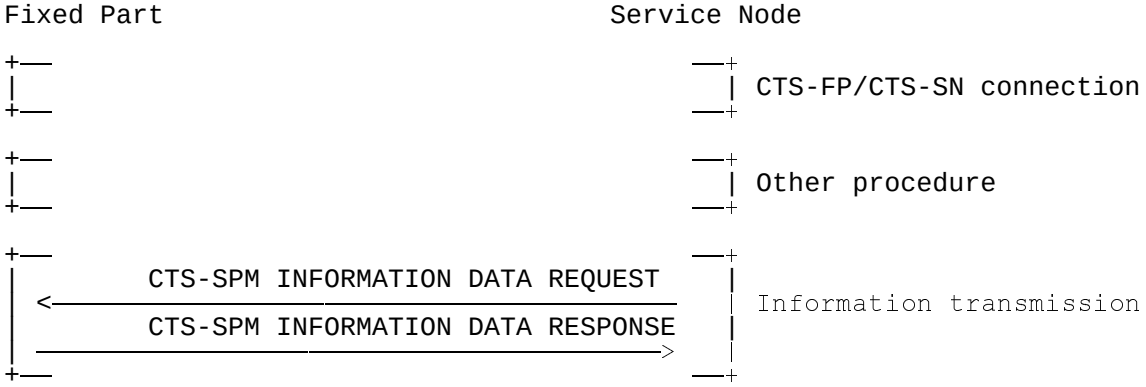

Figure 5.4/GSM 04.xx: Information request procedure

5.5 CTS-FP De-initialisation

The CTS-FP de-initialisation procedure is always initiated by the service node (the CTS-FP/CTS-SN connection is initiated by the fixed part).

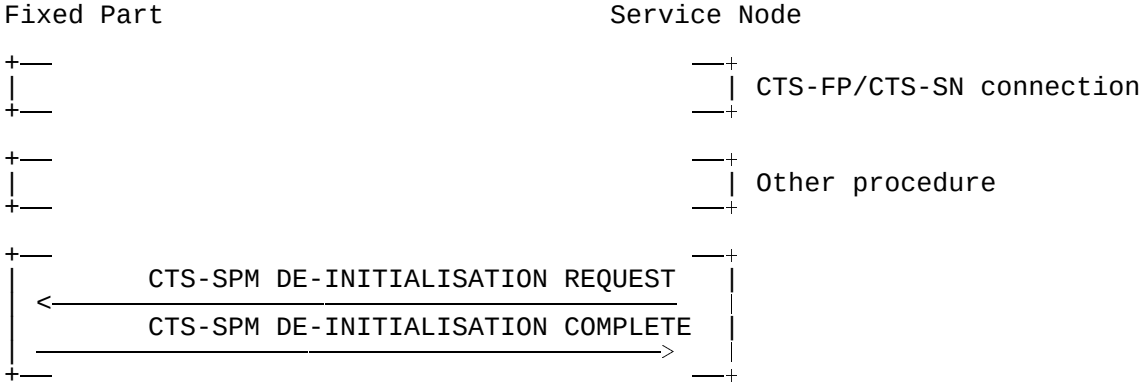

Figure 5.5/GSM 04.xx: CTS-FP De-initialisation procedure

5.6 CTS-SPM De-enrolment

The de-enrolment procedure can be either initiated by the fixed part or by the service node.

5.6.1 CTS-SPM De-enrolment initiated by the fixed part

The de-enrolment indication is sent by the fixed part to the service node.

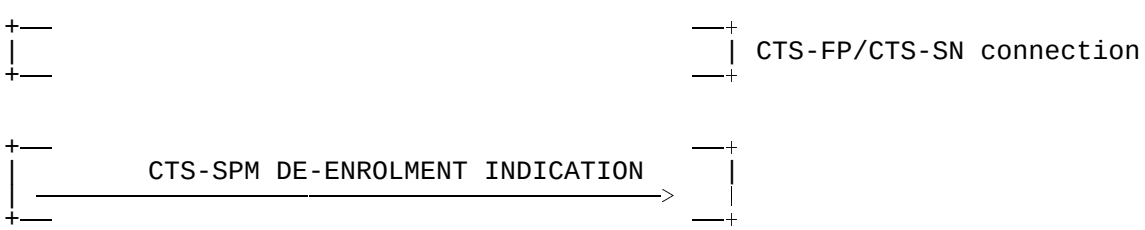

Figure 5.6/GSM 04.xx: CTS-SPM De-enrolment indication

5.6.2 CTS-SPM De-enrolment initiated by the service node

The de-enrolment request is sent by the service node.

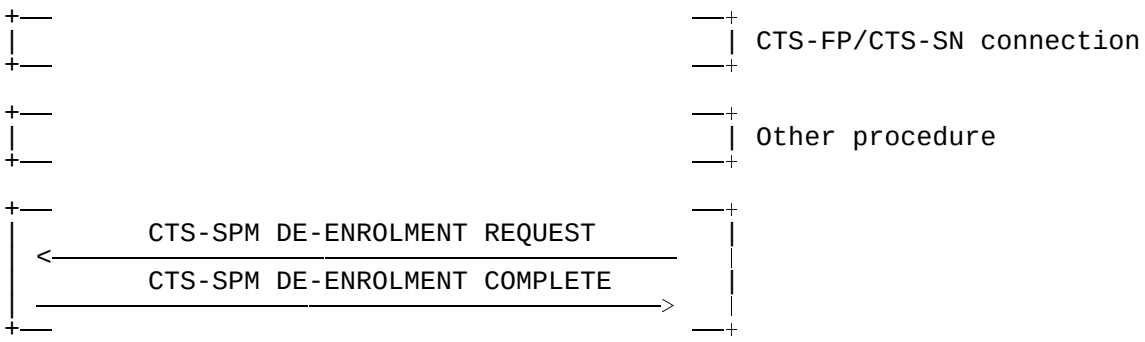

Figure 5.7/GSM 04.xx: CTS-SPM De-enrolment request

6 Handling of unknown, unforeseen, and erroneous protocol data

Please refer to section 8 of GSM 04.08.

7 Message functional definitions and contents

This section defines the structure of the messages of those layer 3 protocols defined in GSM 04.xx. These are standard L3 messages as defined in GSM 04.07.

Each definition given in the present section includes:

a) a brief description of the message direction and use, including whether the message has:

   1) Local significance, i.e. relevant only on the originating or terminating access;

   2) Access significance, i.e. relevant in the originating and terminating access, but not in the CTS-FP;

   3) Dual significance, i.e. relevant in either the originating or terminating access and in the network; or

   4) Global significance, i.e. relevant in the originating and terminating access and in the network.

b) a table listing the information elements known in the message and their order of their appearance in the message. All information elements that may be repeated are explicitly indicated. (V and LV formatted IEs, which compose the imperative part of the message, occur before T, TV, and TLV formatted IEs which compose the non-imperative part of the message, cf. GSM 04.07.) In a (maximal) sequence of consecutive information elements with half octet length, the first information element with half octet length occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N+1 etc. Such a sequence always has an even number of elements.

   For each information element the table indicates:

   1) the information element identifier, in hexadecimal notation, if the IE has format T, TV, or TLV. Usually, there is a default IEI for an information element type; default IEIs of different IE types of the same protocol are different. If the IEI has half octet length, it is specified by a notation representing the IEI as a hexadecimal digit followed by a "-" (example: B-).

NOTE: The same IEI may be used for different information element types in different messages of the same protocol.

   2) the name of the information element (which may give an idea of the semantics of the element). The name of the information element (usually written in italics) followed by "IE" or "information element" is used as reference to the information element within a message.

   3) the name of the type of the information element (which indicates the coding of the value part of the IE), and generally, the referenced subsection of section 8 of GSM 04.xx describing the value part of the information element.

   4) the presence requirement indication (M, C, or O) for the IE as defined in GSM 04.07.

   5) the format of the information element (T, V, TV, LV, TLV) as defined in GSM 04.07.

   6) the length of the information element (or permissible range of lengths), in octets, in the message, where "?" means that the maximum length of the IE is only constrained by link layer protocol, and in the case of the Facility IE by possible further conditions specified in GSM 04.10. This indication is non-normative.

c) subsections specifying, where appropriate, conditions for IEs with presence requirement C or O in the relevant message which together with other conditions specified in GSM 04.xx define when the information elements shall be included or not, what non-presence of such IEs means, and - for IEs with presence requirement C - the static conditions for presence and/or non-presence of the IEs (cf. GSM 04.07).

7.1 Messages for CTS Supervising management

Table 7.1/GSM 04.xx summarises the messages for Supervising management.

Table 7.1/GSM 04.xx: Messages for CTS supervising management

CTS-FP Initialisation messages:	**Reference**
CTS-SPM INITIALISATION REQUEST	7.1.1
CTS-SPM INITIALISATION ACCEPT	7.1.2
CTS-SPM INITIALISATION COMPLETE	7.1.3
CTS-SPM INITIALISATION REJECT	7.1.4
CTS-SPM DE-INITIALISATION REQUEST	7.1.5
CTS-SPM DE-INITIALISATION COMPLETE	7.1.6
CTS-SPM DE-INITIALISATION REJECT	7.1.7
Enrolment messages:	**Reference**
CTS-SPM ENROLMENT REQUEST	7.1.8
CTS-SPM ENROLMENT ACCEPT	7.1.9
CTS-SPM ENROLMENT REJECT	7.1.10
CTS-SPM DE-ENROLMENT INDICATION	7.1.11
CTS-SPM DE-ENROLMENT REQUEST	7.1.12
CTS-SPM DE-ENROLMENT COMPLETE	7.1.13
CTS-SPM DE-ENROLMENT REJECT	7.1.14
Operation data update messages:	**Reference**
CTS-SPM OPERATION DATA REQUEST	7.1.15
CTS-SPM OPERATION DATA DELIVER	7.1.16
CTS-SPM OPERATION DATA ACCEPT	7.1.17
CTS-SPM OPERATION DATA REJECT	7.1.18
CTS-SPM INFORMATION DATA REQUEST	7.1.19
CTS-SPM INFORMATION DATA RESPONSE	7.1.20
FP Authentication messages:	**Reference**
CTS-SPM FP AUTHENTICATION REQUEST	7.1.21
CTS-SPM FP AUTHENTICATION RESPONSE	7.1.22
CTS-SPM FP AUTHENTICATION REJECT	7.1.23
MS Authentication messages:	**Reference**
CTS-SPM MS AUTHENTICATION REQUEST	7.1.24
CTS-SPM MS AUTHENTICATION RESPONSE	7.1.25
CTS-SPM MS AUTHENTICATION REJECT	7.1.26
SN Authentication messages:	**Reference**
CTS-SPM SN SIGNING MODE COMMAND	7.1.27

7.1.1 CTS-FP initialisation request

This message is sent by the fixed part to the service node to indicate to request initialisation on this fixed part. See table 7.2/GSM 04.xx.

Message type: CTS-SPM INITIALISATION REQUEST

Significance: dual

Direction: fixed part to service node

Table 7.2/GSM 04.xx: CTS-SPM INITIALISATION REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS initialisation request message type	Message type 8.4	M	V	1
	Fixed Part Classmark	Fixed Part Classmark 8.4.1.6	M	V	1
	Fixed Part identity	Fixed Part identity 8.4.1.4	M	LV	2-9

7.1.2 CTS-FP initialisation accept

This message is sent by the service node to the fixed part to indicate that initialisation of the fixed part is accepted. See table 7.3/GSM 04.xx.

Message type: CTS-SPM INITIALISATION ACCEPT

Significance: dual

Direction: service node to fixed part

Table 7.3/GSM 04.xx: CTS-SPM INITIALISATION ACCEPT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS initialisation accept message type	Message type 8.4	M	V	1

7.1.3 CTS-FP initialisation complete

This message is sent by the fixed part to the service node to indicate that initialisation of the fixed part has been completed. See table 7.4/GSM 04.xx.

Message type: CTS-SPM INITIALISATION COMPLETE

Significance: dual

Direction: fixed part to service node

Table 7.4/GSM 04.xx: CTS-SPM INITIALISATION COMPLETE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS initialisation complete message type	Message type 8.4	M	V	1

7.1.4 CTS-FP initialisation reject

This message is sent by the service node to the the fixed part to indicate that the requested initialisation has been rejected. See table 7.5/GSM 04.xx.

Message type: CTS-SPM INITIALISATION REJECT

Significance: dual

Direction: service node to fixed part

Table 7.5/GSM 04.xx: CTS-SPM INITIALISATION REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS initialisation reject message type	Message type 8.4	M	V	1
	Reject cause	Reject cause 8.x	M	V	1

7.1.5 CTS-FP de-initialisation request

This message is sent by the service node to the fixed part to indicate to request de-initialisation on this fixed part. See table 7.6/GSM 04.xx.

Message type: CTS-SPM DE-INITIALISATION REQUEST

Significance: dual

Direction: service node to fixed part

Table 7.6/GSM 04.xx: CTS-SPM DE-INITIALISATION REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	½
	Skip Indicator	Skip Indicator 8.3.1	M	V	½
	CTS de-initialisation request message type	Message type 8.4	M	V	1
	Fixed part Classmark	Fixed Part Classmark 8.4.1.6	M	V	1
	Fixed Part identity	Fixed part identity 8.4.1.4	M	LV	2-9

7.1.6 CTS-FP de-initialisation complete

This message is sent by the fixed part to the service node to indicate that the requested de-initialisation has been completed. See table 7.7/GSM 04.xx.

Message type: CTS-SPM DE-INITIALISATION COMPLETE

Significance: dual

Direction: fixed part to service node

Table 7.7/GSM 04.xx: CTS-SPM DE-INITIALISATION COMPLETE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTSde-initialisation complete message type	Message type 8.4	M	V	1

7.1.7 CTS-FP de-initialisation reject

This message is sent by the fixed part to the service node to indicate that the requested de-initialisation has not been completed. See table 7.8/GSM 04.xx.

Message type: CTS-SPM DE-INITIALISATION REJECT

Significance: dual

Direction: fixed part to service node

Table 7.8/GSM 04.xx: CTS-SPM DE-INITIALISATION REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS de-initialisation reject message type	Message type 8.4	M	V	1

7.1.8 CTS enrolment request

This message is sent by the fixed part to the service node to indicate to request a mobile enrolment onto this fixed part. See table 7.9/GSM 04.xx.

Message type: CTS-SPM ENROLMENT REQUEST

Significance:

Direction: fixed part to service node

Table 7.9/GSM 04.xx: CTS-SPM ENROLMENT REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS enrolment request message type	Message type 8.4	M	V	1
	Fixed Part identity	Fixed Part identity 8.4.1.4	M	LV	2-9
	Mobile station identity	Mobile station identity 8.4.1.5	M	LV	2-9
	Cell identity list	Cell identity list 8.4.1.10	M	LV	7n

7.1.9 CTS-SPM enrolment accept

This message is sent by the service node to the fixed part to indicate that enrolment of the mobile station onto the fixed part is accepted. See table 7.10/GSM 04.xx.

Message type: CTS-SPM ENROLMENT ACCEPT

Significance:

Direction: service node to fixed part

Table 7.10/GSM 04.xx: CTS-SPM ENROLMENT ACCEPT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS-SPM enrolment accept message type	Message type 8.4	M	V	1
	Enrolment time	Enrolment time 8.4.1.12	M	V	1

7.1.10 CTS-SPM enrolment reject

This message is sent by the service node to the fixed part to indicate that the requested enrolment has been rejected. See table 7.11/GSM 04.xx.

Message type: CTS-SPM ENROLMENT REJECT

Significance: dual

Direction: service node to fixed part

Table 7.11/GSM 04.xx: CTS-SPM ENROLMENT REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS-SPM enrolment reject message type	Message type 8.4	M	V	1
	Reject cause	Reject cause 8.x	M	V	1

7.1.11 CTS-SPM de-enrolment indication

This message is sent by the fixed part to the service node to indicate de-enrolment of a mobile station from this fixed part. See table 7.12/GSM 04.xx.

Message type: CTS-SPM DE-ENROLMENT INDICATION

Significance: dual

Direction: fixed part to service node

Table 7.12/GSM 04.xx: CTS-SPM DE-ENROLMENT INDICATION message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS-SPM de-enrolment indication message type	Message type 8.4	M	V	1
	Mobile station identity	Mobile station identity 8.4.1.5	M	LV	2-9
	Fixed part identity	Fixed part identity 8.4.1.4	M	LV	2-9
	Cause	cause 8.x	M	V	1

7.1.12 CTS-SPM de-enrolment request

This message is sent by the service node to the fixed part to indicate to request de-enrolment of a given mobile station from the fixed part. See table 7.13/GSM 04.xx.

Message type: CTS-SPM DE-ENROLMENT REQUEST

Significance: dual

Direction: service node to fixed part

Table 7.13/GSM 04.xx: CTS-SPM DE-ENROLMENT REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS de-enrolment request message type	Message type 8.4	M	V	1
	Fixed part identity	Fixed part identity 8.4.1.4	M	LV	2-9
	Mobile station identity	Mobile station identity 8.4.1.5	M	LV	2-9

7.1.13 CTS-SPM de-enrolment complete

This message is sent by the fixed part to the service node to indicate that the requested de-enrolment has been completed. See table 7.14/GSM 04.xx.

Message type: CTS-SPM DE-ENROLMENT COMPLETE

Significance: dual

Direction: fixed part to service node

Table 7.14/GSM 04.xx: CTS-SPM DE-ENROLMENT COMPLETE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	½
	Skip Indicator	Skip Indicator 8.3.1	M	V	½
	CTS de-enrolment complete message type	Message type 8.4	M	V	1

7.1.14 CTS-SPM de-enrolment reject

This message is sent by the fixed part to the service node to indicate that the requested de-enrolment has not been completed. See table 7.15/GSM 04.xx.

Message type: CTS-SPM DE-ENROLMENT REJECT

Significance: dual

Direction: fixed part to service node

Table 7.15/GSM 04.xx: CTS-SPM DE-ENROLMENT REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	½
	Skip Indicator	Skip Indicator 8.3.1	M	V	½
	CTS de-enrolment reject message type	Message type 8.4	M	V	1

7.1.15 CTS operation data request

This message is sent by the fixed part to the service node to indicate that operation data are required. See table 7.16/GSM 04.xx.

Message type: CTS-SPM OPERATION DATA REQUEST

Significance: dual

Direction: fixed part to service node

Table 7.16/GSM 04.xx: CTS-SPM OPERATION DATA REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS operation data request	Message type 8.4	M	V	1
	Fixed part identity	Fixed part identity 8.4.1.4	M	LV	2-9
	Cell identity list	Cell identity list 8.4.1.10	M	LV	7n

7.1.16 CTS operation data deliver

This message is sent by service node to the fixed part to deliver the operation data either following an FP request or initiated by the service node. See table 7.17/GSM 04.xx.

Message type: CTS-SPM DE-OPERATION DATA DELIVER

Significance: dual

Direction: service node to fixed part

Table 7.17/GSM 04.xx: CTS-SPM OPERATION DATA DELIVER message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS operation data deliver message type	Message type 8.4	M	V	1
	Radio frequency control parameters	Radio frequency control parameters 8.4.1.7	M	V	4
	Radio link control parameters	Radio link control parameters 8.4.1.8	M	V	4
	Generic frequency list	GFL 8.4.1.9	M	LV	
	Validity period	Tval 8.4.1.13	M	V	1
	Recall period	Trecal 8.4.1.14	M	V	1
	Application time	Tapplic 8.4.1.x	M	V	1

7.1.17 CTS operation data accept

This message is sent by the fixed part to the service node to indicate that the operation data sent the service node have been accepted by the fixed part. See table 7.18/GSM 04.xx.

Message type: CTS-SPM OPERATION DATA ACCEPT

Significance: dual

Direction: fixed part to service node

Table 7.18/GSM 04.xx: CTS-SPM OPERATION DATA ACCEPT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS operation data accpet message type	Message type 8.4	M	V	1

7.1.18 CTS operation data reject

This message is sent by the fixed part to the service node to indicate that the operation data sent the service node have not been accepted by the fixed part. See table 7.19/GSM 04.xx.

Message type: CTS-SPM DE-OPERATION DATA REJECT

Significance: dual

Direction: fixed part to service node

Table 7.19/GSM 04.xx: CTS-SPM OPERATION DATA REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS operation data accpet message type	Message type 8.4	M	V	1
	Reject cause	Reject cause 8.X	M	V	1

7.1.19 CTS information data request

This message is sent by the service node to the fixed part indicate that information data are required. See table 7.20/GSM 04.xx.

Message type: CTS-SPM INFORMATION DATA REQUEST

Significance: dual

Direction: service node to fixed part

Table 7.20/GSM 04.xx: CTS-SPM INFORMATION DATA REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS information data request message type	Message type 8.4	M	V	1
	Information data	Information data 8.4.1.x	M	LV	tbd

7.1.20 CTS information data response

This message is sent by the fixed part to the service node in response to an information data request. See table 7.21/GSM 04.xx.

Message type: CTS-SPM INFORMATION DATA response

Significance: dual

Direction: fixed part to service node

Table 7.21/GSM 04.xx: CTS-SPM INFORMATION DATA RESPONSE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS information data response message type	Message type 8.4	M	V	1
	Information data	Information data 8.4.1.x	M	LV	tbd

7.1.21 CTS FP authentication request

This message is sent by the service node to the fixed part to initiate authentication of the fixed part identity. See table 7.22/GSM 04.xx.

Message type: CTS-SPM FP AUTHENTICATION REQUEST

Significance:

Direction: service node to the fixed part

Table 7.22/GSM 04.xx: CTS-SPM FP AUTHENTICATION REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS FP authentication request message type	Message type 8.4	M	V	1
	Authentication parameter RAND1	Authentication parameter RAND1 8.4.1.1	M	V	16

7.1.22 CTS FP authentication response

This message is sent by the the fixed part to the service node to to deliver a calculated response to the service node. See table 7.23/GSM 04.xx.

Message type: CTS-SPM FP AUTHENTICATION RESPONSE

Significance: dual

Direction: fixed part to service node

Table 7.23/GSM 04.xx: CTS-SPM FP AUTHENTICN RESPONSE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS FP authentication response message type	Message type 8.4	M	V	1
	Authentication parameter RAND2	Authentication parameter RAND2 8.4.1.2	M	V	16
	Authentication parameter SRES	Authentication parameter SRES 8.4.1.3	M	V	16

7.1.23 CTS FP authentication reject

This message is sent by the service node to the fixed part to inidicate that authentication of the fixed part identity has failed. See table 7.24/GSM 04.xx.

Message type: CTS-SPM FP AUTHENTICATION REJECT

Significance: dual

Direction: service node to the fixed part

Table 7.24/GSM 04.xx: CTS-SPM FP AUTHENTICATION REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS FP authentication reject message type	Message type 8.4	M	V	1

7.1.24 CTS MS authentication request

This message is sent by the service node to the fixed part to initiate authentication of the mobile station identity. See table 7.25/GSM 04.xx.

Message type: CTS-SPM MS AUTHENTICATION REQUEST

Significance: dual

Direction: service node to the fixed part

Table 7.25/GSM 04.xx: CTS-SPM MS AUTHENTICATION REQUEST message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS MS authentication request message type	Message type 8.4	M	V	1
	Mobile station identity	Mobile station identity 8.4.1.5	M	LV	2-9
	Authentication parameter RAND	Authentication parameter RAND 8.x	M	V	16

7.1.25 CTS MS authentication response

This message is sent by the the fixed part to the service node to to deliver a response calculated by the mobile station to the service node. See table 7.26/GSM 04.xx.

Message type: CTS-SPM MS AUTHENTICATION RESPONSE

Significance: dual

Direction: fixed part to service node

Table 7.26/GSM 04.xx: CTS-SPM MS AUTHENTICATION RESPONSE message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS MS authentication response message type	Message type 8.4	M	V	1
	Mobile station identity	Mobile station identity 8.4.1.5	M	LV	2-9
	Authentication parameter SRES	Authentication parameter SRES 8.x	M	V	4

7.1.26 CTS MS authentication reject

This message is sent by the service node to the fixed part to inidicate that authentication of the mobile station identity has failed. See table 7.27/GSM 04.xx.

Message type: CTS-SPM MS AUTHENTICATION REJECT

Significance:

Direction: service node to the fixed part

Table 7.27/GSM 04.xx: CTS-SPM MS AUTHENTICATION REJECT message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS MS authentication reject message type	Message type 8.4	M	V	1

7.1.27 CTS SN signing mode command

This message is sent by the service node to the fixed part to indicate that the service node starts signing. See table 7.28/GSM 04.xx.

Message type: CTS-SPM SN signing mode command

Significance: dual

Direction: service node to fixed part

Table 7.28/GSM 04.xx: CTS-SPM SN signing mode command message content

IEI	Information element	Type / Reference	Presence	Format	Length
	CTS supervising management protocol discriminator	Protocol discriminator 8.2	M	V	1/2
	Skip Indicator	Skip Indicator 8.3.1	M	V	1/2
	CTS signing mode command message type	Message type 8.4	M	V	1

8 General message format and information elements coding

The figures and text in this section describe the Information Elements contents.

8.1 Overview

See corresponding section in GSM 04.08.

8.2 Protocol Discriminator

The Protocol Discriminator (PD) and its use are defined in GSM 04.07 [20].

8.3 Skip indicator and transaction identifier

8.3.1 Skip indicator

Bits 5 to 8 of the first octet of every CTS Radio Resource management and CTS Mobility Management message contains the skip indicator. In order to differentiate GSM Radio Resource management and GSM Mobility Management messages from CTS Radio Resource management and CTS Mobility Management messages, the skip indicator used shall be 1111. A message received with skip indicator different from 1111 shall be ignored by the CTS Radio Resource management protocol entity and by the CTS Mobility Management protocol entity. A protocol entity sending a CTS Radio Resource management or a CTS Mobility Management message shall encode the skip indicator as 1111.

8.3.2 Transaction identifier

See GSM 04.08.

8.4 Message Type

The message type IE and its use are defined in GSM 04.07 [20]. Tables 8.1/GSM 04.xx define the value part of the message type IE used in the CTS Supervising management protocol.

Table 8.1/GSM 04.xx: Message types for CTS Supervising management

8 7 6 5 4 3 2 1	
0 0 1 1 1 - - -	CTS-FPInitialisation messages:
1 1 1	- CTS-SPM INITIALISATION REQUEST
0 0 1	- CTS-SPM INITIALISATION ACCEPT
0 1 0	- CTS-SPM INITIALISATION COMPLETE
1 0 0	- CTS-SPM INITIALISATION REJECT
0 0 1 1 0 - - -	CTS-FP De-initialisation messages:
1 0 1	- CTS-SPM DE-INITIALISATION REQUEST
0 1 0	- CTS-SPM DE-INITIALISATION COMPLETE
0 0 1	- CTS-SPM DE-INITIALISATION REJECT
0 0 1 0 1 - - -	Enrolment messages:
0 1 1	- CTS-SPM ENROLMENT REQUEST
1 0 0	- CTS-SPM ENROLMENT ACCEPT
0 0 0	- CTS-SPM ENROLMENT REJECT
0 0 0 0 1 - - -	De-Enrolment messages:
1 0 1	- CTS-SPM DE-ENROLMENT INDICATION
1 1 0	- CTS-SPM DE-ENROLMENT REQUEST
0 1 1	- CTS-SPM DE-ENROLMENT COMPLETE
0 0 0	- CTS-SPM DE-ENROLMENT REJECT
0 0 1 0 0 - - -	Operation data update messages:
0 0 1	- CTS-SPM OPERATION DATA REQUEST
0 1 0	- CTS-SPM OPERATION DATA DELIVER
1 0 0	- CTS-SPM OPERATION DATA ACCEPT
1 1 1	- CTS-SPM OPERATION DATA REJECT
0 0 0 1 1 - - -	Information data request messages:
0 0 1	- CTS-SPM INFORMATION DATA REQUEST
0 1 0	- CTS-SPM INFORMATION DATA RESPONSE
0 0 0 1 0 - - -	Authentication messages:
0 0 0	- CTS-SPM FP AUTHENTICATION REQUEST
0 1 0	- CTS-SPM FP AUTHENTICATION RESPONSE
1 1 1	- CTS-SPM FP AUTHENTICATION REJECT
1 0 0	- CTS-SPM MS AUTHENTICATION REQUEST
1 0 1	- CTS-SPM MS AUTHENTICATION RESPONSE
1 1 0	- CTS-SPM MS AUTHENTICATION REJECT
0 1 1	- CTS-SPM SN SIGNING MODE COMMAND

Bit 8 is reserved for possible future use as an extension bit, see GSM 04.07.

8.4.1 Supervising management information elements.

8.4.1.1 Authentication parameter RAND1

The purpose of the *Authentication Parameter RAND1* information element is to provide the fixed part with a non-predictable number to be used to calculate the authentication response SRES.

The *Authentication Parameter RAND1* information element is coded as shown in figure 10.x/GSM 04.xx and table 10.x/GSM 04.xx.

The *Authentication Parameter RAND1* is a type 3 information element with 17 octets length.

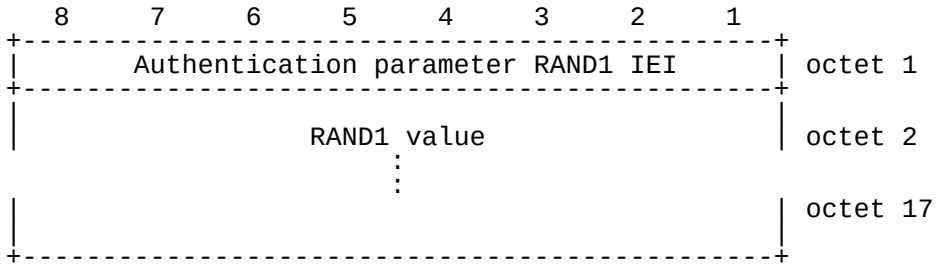

Figure 10.x/GSM 04.xx *Authentication Parameter RAND1* information element

Table 10.x/GSM 04.xx: *Authentication Parameter RAND1* information element

RAND1 value (octet 2, 3,... and 17) The RAND1 value consists of 128 bits. Bit 8 of octet 2 is the most significant bit while bit 1 of octet 17 is the least significant bit.

8.4.1.2 Authentication parameter RAND2

The purpose of the *Authentication Parameter RAND2* information element is to provide the service node with a non-predictable number to be used by the service node to calculate the data signature .

The *Authentication Parameter RAND2* information element is coded as shown in figure 10.x/GSM 04.xx and table 10.x/GSM 04.xx.

The *Authentication Parameter RAND2* is a type 3 information element with 17 octets length.

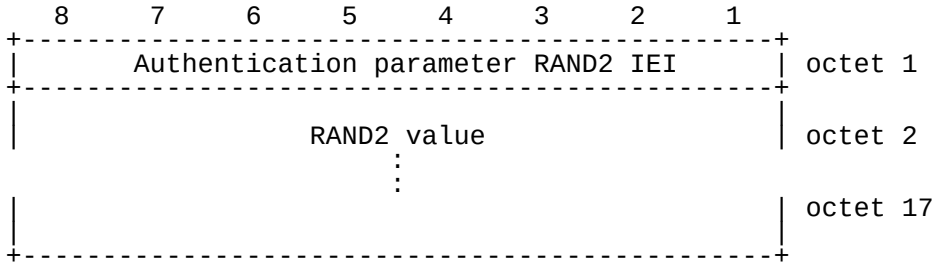

Figure 10.x/GSM 04.xx *Authentication Parameter RAND2* information element

Table 10.x/GSM 04.xx: *Authentication Parameter RAND2* information element

RAND2 value (octet 2, 3,... and 17) The RAND2 value consists of 128 bits. Bit 8 of octet 2 is the most significant bit while bit 1 of octet 17 is the least significant bit.

8.4.1.3 Authentication parameter SRES

The purpose of the *authentication parameter SRES* information element is to provide the service node with the authentication response signature calculated in the fixed part.

The *Authentication Parameter SRES* information element is coded as shown in figure 10.x/GSM 04.xx and table 10.x/GSM 04.xx.

The *Authentication Parameter SRES* is a type 3 information element with 17 octets length.

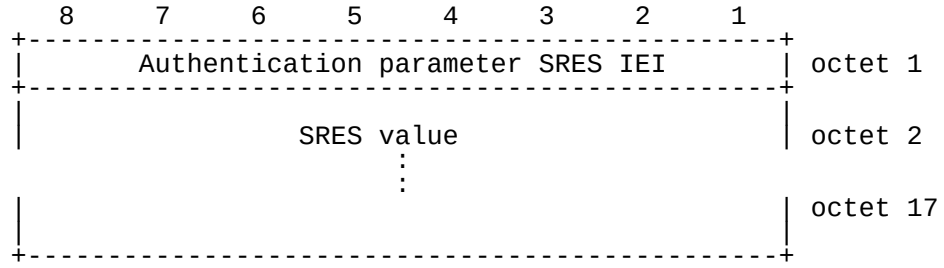

Figure 10.x/GSM 04.xx *Authentication Parameter SRES* information element

Table 10.x/GSM 04.xx: *Authentication Parameter SRES* information element

SRES value (octet 2, 3,... and 17) The SRES value consists of 128 bits. Bit 8 of octet 2 is the most significant bit while bit 1 of octet 17 is the least significant bit.

8.4.1.4 Fixed part Identity

The purpose of the *Fixed part Identity* information element is to provide either the international fixed part subscriber identity, IFPSI, or the international fixed part equipment identity, IFPEI.

The IFPSI shall not exceed 15 digits, the IFPEI is composed of 16 digits (see GSM 03.03).

The *Fixed part Identity* information element is coded as shown in figure 10.x/GSM 04.xx and table 10.x/GSM 04.xx.

The Fixed part Identity is a type 4 information element with a minimum length of 3 octets and 11 octets length maximal.

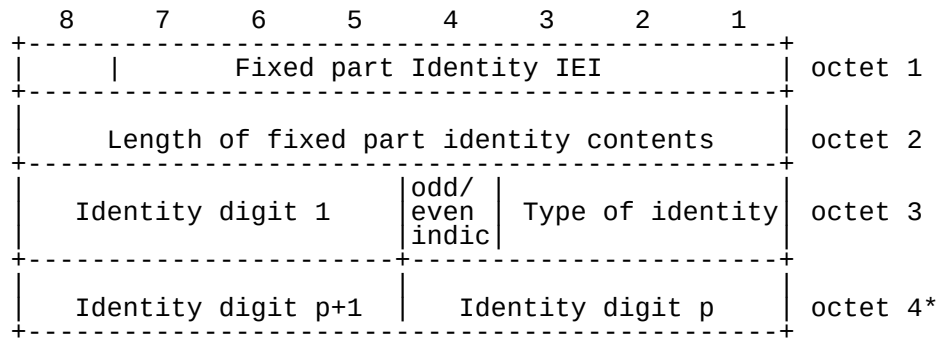

Figure 10.5/GSM 04.xx *Fixed part Identity* information element

Table 10.8/GSM 04.xx: *Fixed part Identity* information element

Type of identity (octet 3) Bits 3 2 1 0 0 1 IFPSI 0 1 0 IFPEI All other values are reserved. Odd/even indication (octet 3) Bit 4 0 even number of identity digits and also when 1 odd number of identity digits Identity digits (octet 3 etc) For the IFPSI, IFPEI this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111".

8.4.1.5 Mobile station Identity

The purpose of the *Mobile station Identity* information element is to provide to the service node the international mobile station subscriber identity, IMSI.

The IMSI shall not exceed 15 digits (see GSM 03.03).

The *Mobile station Identity* information element is coded as shown in figure 10.x/GSM 04.xx and table 10.x/GSM 04.xx.

The Mobile station Identity is a type 4 information element with a minimum length of 3 octets and 11 octets length maximal.

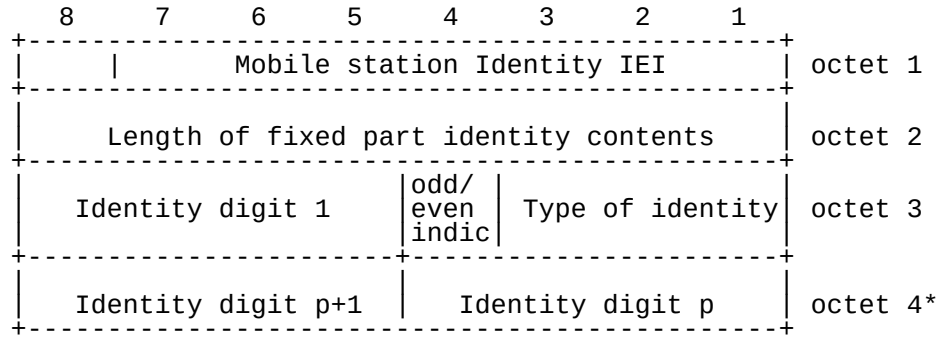

Figure 10.5/GSM 04.xx *Mobile station Identity* information element

Table 10.8/GSM 04.xx: *Mobile* station *Identity* information element

Type of identity (octet 3) Bits 3 2 1 0 0 1 IMSI All other values are reserved. Odd/even indication (octet 3) Bit 4 0 even number of identity digits and also when 1 odd number of identity digits Identity digits (octet 3 etc) For the IMSI this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111".

8.4.1.6 Fixed Part Classmark

The purpose of the *Fixed part Classmark* information element is to provide the service node with information concerning charactersitics of the fixed part. The contents might affect the manner in which the service node handles the operation of the fixed part.

The Fixed Part Classmark information element has 2 octets length.

The value part of a *Fixed Part Classmark* information element is coded as shown in figure 10.5.1.7/GSM 04.xx.

Table 10.5.1.7/GSM 04.xx: *Fixed Part Classmark* information element

8	7	6	5	4	3	2	1	
Fixed part Classmark IEI								octet 1
0 spare	Band			0 spare	0	0	0	octet 2

Table 10.8/GSM 04.xx: *Fixed part Classmark* information element

Band (octet 2) Bits 7 6 5 0 0 0 GSM900 band supported 0 0 1 E-GSM band supported 0 1 0 DCS1800 band supported 0 1 1 GSM1900 band supported All other values are reserved.

8.4.1.7 Radio frequency control Parameters

The purpose of the Radio Frequency control parameters information element is to provide the radio parameters to be applied on the fixed part.

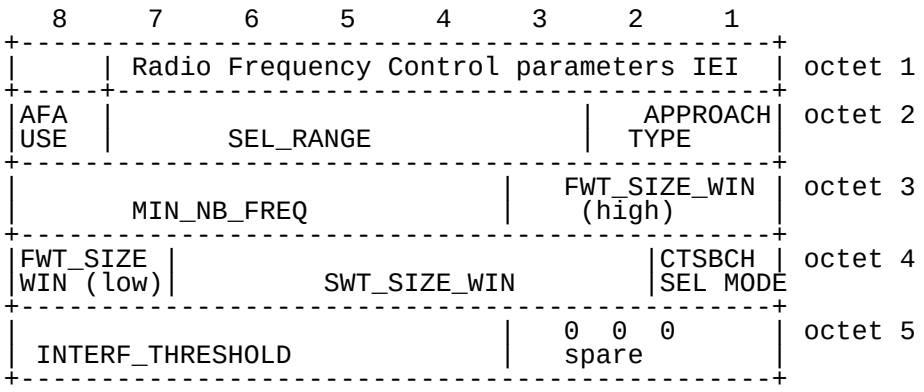

Figure 10.2/GSM 04.xx *Radio Frequency Control Parameters* information element

Table 10.8/GSM 04.xx: *Radio Frequency Control Parameters* information element

```
AFA_USE, use of AFA algorithm (octet 2)
Bit
8
0 AFA used
1 AFA not used


SEL_RANGE, carrier list selection upper bound (octet 2)
Bits
7 6 5 4 3
0 0 0 0 0  range 0
0 0 0 0 1  range 1
    .
    .
 1 1 1 1 1 range 31


APPROACH TYPE, type of approach used in slection range
(octet 2)

Bits
 2 1
 0 0    Basic Threshold (BASIC)
 0 1    Sliding window technique (SWT)
 1 0    Fixed window technique (FWT)
 1 1    List extension check (EXT)

MIN_NB_FREQ, minimum number of frequency (octet 3)

Bits
8 7 6 5 4
0 0 0 0 0  no frequency
0 0 0 0 1   1 frequency
   .
   .
1 1 1 1 1  31 frequencies

FWT_SIZE_WIN, minimum size of the window for FWT
(octet 3 and octet 4)

Bits
 3 2 1 8 7

 0 0 0 0 0  size 0
 0 0 0 0 0  size 1
     .
     .
 1 1 1 1 1  size 31

SWT_SIZE_WIN, fixed size of the window for SWT
(octet 4)

Bits
6 5 4 3 2
0 0 0 0 0  size
0 0 0 0 0  size 1
     .
     .
1 1 1 1 1  size 31

CTSBCH_SEL_MODE, CTSBCH selection mode (octet 4)

Bit
1
0  best carrier of TFH list
1  random carrier of TFH list

INTERF_THRESHOLD, interference threshold (octet 5)

Bits
8 7 6 5 4
0 0 0 0 0   0dB   (steps of 2dB)
0 0 0 0 0   2dB

1 1 1 1 1   62dB
```

8.4.1.8 Radio link control Parameters

The purpose of the *Radio Link control Parameters* information element is to provide the radio parameters to be applied on the fixed part.

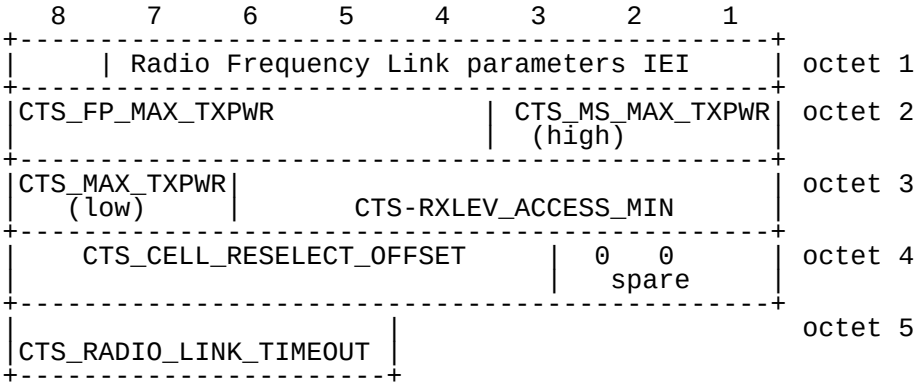

Figure 10.2/GSM 04.xx *Radio Link Control Parameters* information element

Table 10.8/GSM 04.xx: *Radio Link Control Parameters* information element

```
+-----------------------------------------------------------+
|CTS_FP_MAX_TXPWR, maximum Fixed Part transmission power    |
|(octet 2)                                                  |
| Bits                                                      |
| 8 7 6 5 4                                                 |
| 0 0 0 0 0  level 0                                        |
| 0 0 0 0 1  level 1                                        |
|     .                                                     |
|     .                                                     |
|  1 1 1 1 1 level 31                                       |
|                                                           |
| CTS_MX_MAX_TXPWR, maximum Mobile Station transmission     |
|power(octet 2 and octet 3)                                 |
| Bits                                                      |
| 3 2 1 8 7                                                 |
| 0 0 0 0 0  level 0                                        |
| 0 0 0 0 1  level 1                                        |
|     .                                                     |
|     .                                                     |
| 1 1 1 1 1  level 31                                       |
|                                                           |
| CTS_RXLEV_ACCESS_MIN, minimum received level at the MS    |
| (octet 3)coded as defined in GSM05.08                     |
| Bits                                                      |
| 6 5 4 3 2 1                                               |
| 0 0 0 0 0 0 level 0                                       |
| 0 0 0 0 0 1 level 1                                       |
|     .                                                     |
|     .                                                     |
| 1 1 1 1 1 1  level 63                                     |
|                                                           |
|CTS_CELL_RESELECT_OFFSET_, reselection offest(octet 4)     |
| Bits                                                      |
| 8 7 6 5 4 3                                               |
| 0 0 0 0 0 0  O dB                                         |
| 0 0 0 0 0 1  1 dB                                         |
|    .                                                      |
|    .                                                      |
| 1 1 1 1 1 1  63 dB                                        |
|                                                           |
| CTS_RADIO_LINK_TIMEOUT, maximum value of the radio        |
|link counter(octet 5)                                      |
| Bits                                                      |
|  8 7 6 5                                                  |
|  0 0 0 0 4  SACCH blocks  (setps of 4 blocks)             |
|  0 0 0 1 8  SACCH blocks                                  |
|      .                                                    |
|      .                                                    |
|  1 1 1 1 64 SACCH blocks                                  |
+-----------------------------------------------------------+
```

8.4.1.9 Generic Frequency List

The purpose of the *Generic Frequency List* information element is to provide the generic frequency list to be used to derive the AFA list (see GSM04.56) to be used on the CTS interface.

Its coding is similar to the "GSM04.08 Cell Channel Description" information field coding.

8.4.1.10 Cell Identity List

The purpose of the *Cell Identity List* information element is to provide to the service node the list of the cell global identities surrounding the fixed part.

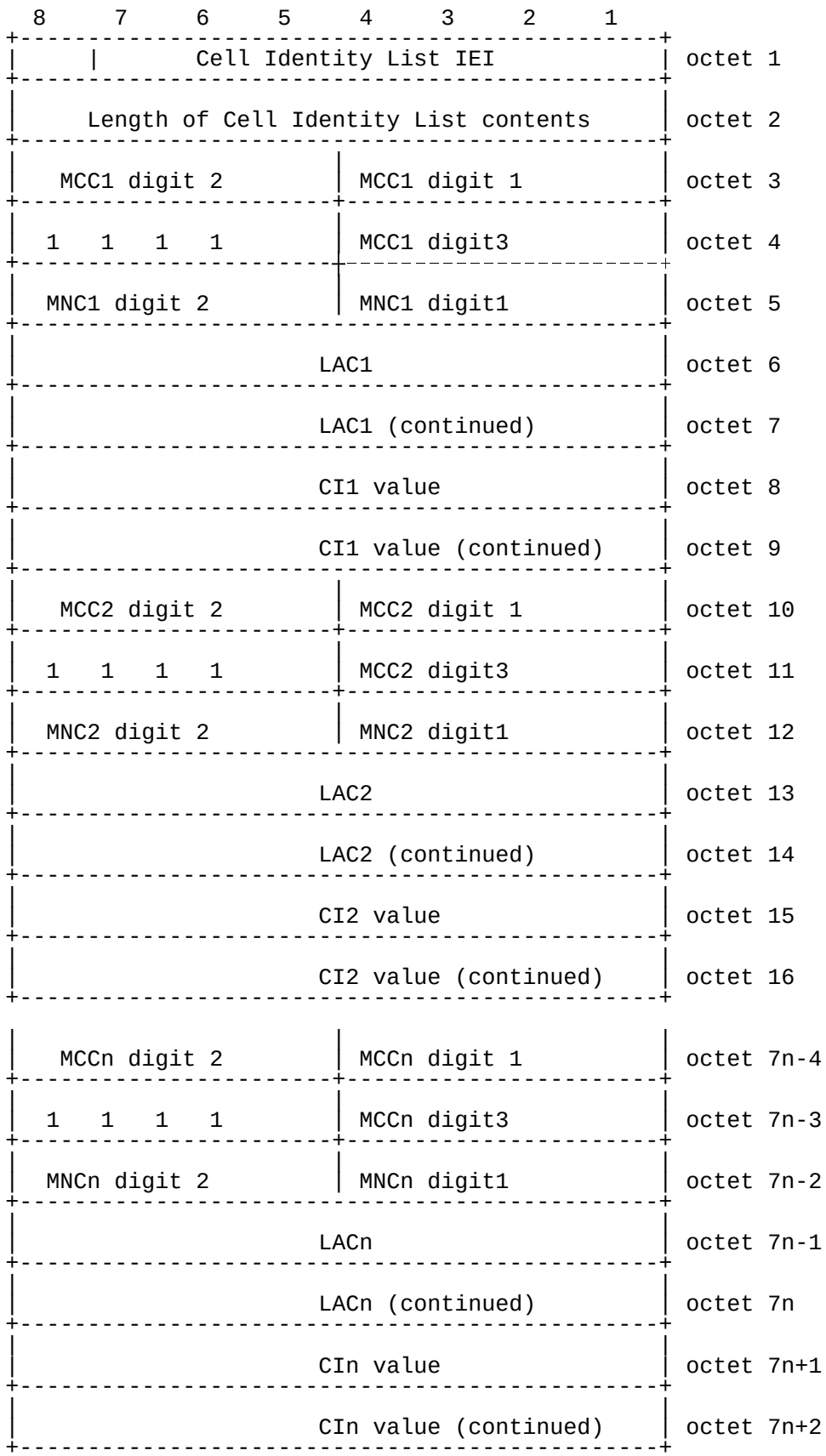

Figure 10.5/GSM 04.xx *Cell Identity List* information element

Table 10.8/GSM 04.xx: *Cell Identity List* information element

MCC, Mobile country code(octets 7n-4 and 7n-3) MNC, Mobile Network code (octet 7n-2) LAC, Location area code (octets 7n-1 and 7n) These fields are coded as the "Location Area Identification" Information element in GSM04.08 CI, Cell Identity (octets 7n+1 and 7n+2) is coded as "Cell Identity" Information element in GSM04.08

8.4.1.11 Application time

The purpose of the *Application time* information element is to provide to the fixed part the time when the new control data sent by the service node should apply.

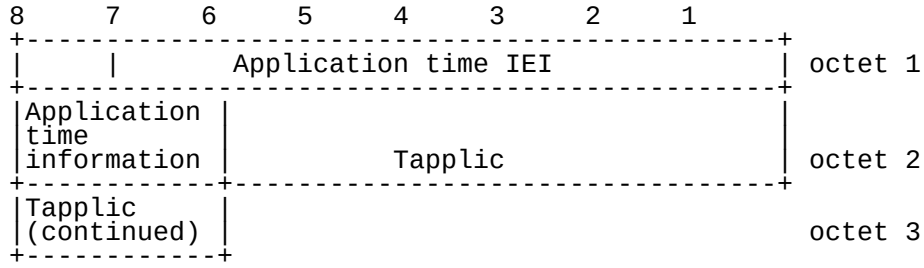

Figure 10.5/GSM 04.xx *Application time* information element

Table 10.8/GSM 04.xx: Application time information element

Application time information(octet 2) Bits 8 7 0 0 apply immediately 0 1 apply at Tval expiry 1 0 apply at Tapplic All other values are reserved. Tapplic, application timer (octets 2 and 3) Bits 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 0 Tapplic = 0day 0 0 0 0 0 0 0 1 Tapplic = 1day ..... 1 1 1 1 1 1 1 1 Tapplic = 255days

8.4.1.12 Enrolment time

The purpose of the *Enrolment time* information element is to provide to the fixed part the duration associated to a mobile enrolment.

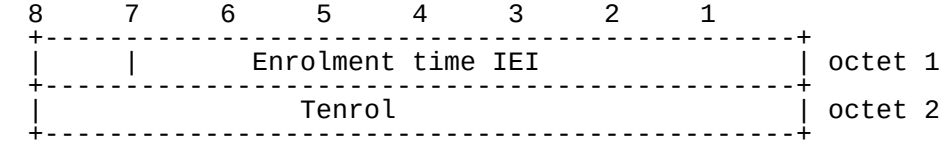

Figure 10.5/GSM 04.xx *Enrolment time* information element

Table 10.8/GSM 04.xx: Enrolment time information element

Enrolment time information(octet 2)	
Bits	
8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	Tenrol = 0day
0 0 0 0 0 0 0 1	Tenrol = 1day
.....	
1 1 1 1 1 1 1 1	Tenrol = 255days

8.4.1.13 Validity period

The purpose of the *Validity period* information element is to provide to the fixed part the validity period associated with parameters updated by the service node.

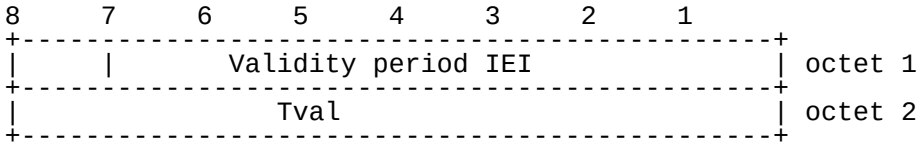

Figure 10.5/GSM 04.xx *Validity period* information element

Table 10.8/GSM 04.xx: Validity period information element

Validity period information(octet 2)	
Bits	
8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	Tval = 0day
0 0 0 0 0 0 0 1	Tval = 1day
.....	
1 1 1 1 1 1 1 1	Tval = 255days

8.4.1.14 Recall period

The purpose of the *Recall period* information element is to require the fixed part to contact the service node for control purposes.

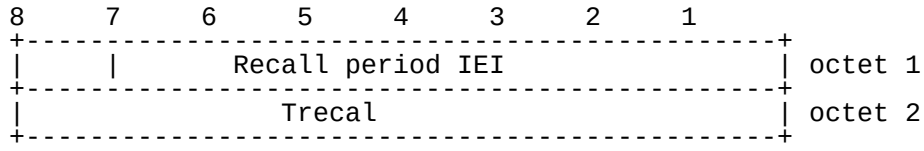

Figure 10.5/GSM 04.xx *Recall* period information element

Table 10.8/GSM 04.xx: Recall period information element

Recall period information(octet 2)
Bits 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 0 Trecal = 0day 0 0 0 0 0 0 0 1 Trecal = 1day ..... 1 1 1 1 1 1 1 1 Trecal = 255days

9 List of system parameters

The description of timers in the following table should be considered a brief summary. The precise details are found in sections 3 to 6, which should be considered the definitive descriptions.

9.1 Timers and counters for radio resource management

9.1.1 Timers on the SN side

9.1.2 Timers on the CTS-FP side

Annex A (informative): Change Request History

Change history					
CN No.	**Document number**	**CR. No.**	**Old version**	**New version**	**Subject/Comments**
S31			7.0.1	8.0.0	Upgrade of specification to release 1999/ V8.0.0
			8.0.0	8.0.1	Version update to 8.0.1 for Publication
CN#11			8.0.1	4.0.0	Release 4 after CN#11

History

Document history		
V4.0.0	March 2001	Publication