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Agenda Item: **4.2**

Source: **RAN Vice Chairman on behalf of 3GPP2**

To: **RAN#7**

Title: **3GPP2 MC MAP**

Document for: **For information**

The attached document contains the necessary changes elaborated by 3GPP2 to modify MC in order to allow the inter-working of MC on an GSM-MAP core network.

The intent of this contribution is to provide RAN with information on the completion status of the harmonisation between 3GPP and 3GPP2.

1

3GPP2 C.P9003

Date: January 28, 2000

2 # *Multi-Carrier Specification for Spread Spectrum*
3 # *Systems on GSM MAP (MC-MAP)*
4 # *(Lower Layers Air Interface)*

5

6

1 No text.

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FOREWORD

(This foreword is not part of this Standard)

This Standard was prepared by Technical Specification Group C of the Third Generation Partnership Project 2 (3GPP2). This Standard defines changes to cdma2000 CDMA Multi-Carrier Mode standard to enable operation with the (GSM) Mobile Application Part (MAP).

This standard is part of the IMT-2000 standards for wireless systems based upon cellular principles. This standard is based upon combining the Physical Layer, Medium Access Control Layer, Link Access Control, and Radio Resource Control Layers of the IMT-2000 CDMA Multi-Carrier (MC) standard with the Connection Management (CM) and Mobility Management (MM) layers from the UTRA standards developed by 3GPP. This mode of operation is known as Multi-Carrier (MC) using GSM MAP, or MC-MAP.

This Standard defines the modifications that are required to the cdma2000 series of Standards to support operation using the Connection Management (CM) and Mobility Management (MM) layers of the UTRA standards. This Standard consists of the following sections:

1. Introduction. This section describes the basic architecture of the system that combines the GSM-MAP core network with the cdma2000 Radio Access Network. This section also provides a list of terms that are used in the Standard.

2. Modifications to C.S0001-A, *Introduction to cdma2000 Standards for Spread Spectrum Systems*. This section describes the changes that are required to 3GPP2 C.S0001-A to support MC-MAP operation.

3. Modifications to C.S0002-A, *Physical Layer Standard for cdma2000 Spread Spectrum Systems*. This section describes the changes that are required to 3GPP2 C.S0002-A to support MC-MAP operation. The changes move the assignment of the public long code mask to the Upper Layers. This is to remove the dependence on the ESN, an identity used in TIA/EIA-41 networks.

4. Modifications to C.S0003-A, *Medium Access Control (MAC) Standard for cdma2000 Standards for Spread Spectrum Systems*. No changes are required to 3GPP2 C.S0003-Ato support MC-MAP operation.

5. Modifications to C.S0004-A, *Signaling Link Access Control (LAC) Standard for cdma2000 Standards for Spread Spectrum Systems*. This section describes the changes that are required to 3GPP2 C.S0004-A to support MC-MAP operation. The changes to this section add an enhanced services sublayer, add addresses used in MAP systems, disable the LAC layer authentication, and add parameters for the new messages that have been created to support GSM layer 3 signaling.

6. Modifications to C.S0005-A, *Upper Layer (Layer 3) Signaling Standard for cdma2000 Standards for Spread Spectrum Systems*. This section describes the changes that are required to 3GPP2 C.S0005-A to support MC-MAP operation. The changes to this section consist of some enhancements to the Radio Resource (RR) management function of cdma2000 and the deletion of capabilities that are specific to operation with a TIA/EIA-41 network. To aid in the understanding of the RRC, a description is provided of the RRC procedures.

NOTES

1. Compatibility, as used in connection with this Standard, is understood to mean: Any mobile station supporting MC-MAP operation is able to place and receive calls in any system supporting MC-MAP operation. Conversely all MC-MAP base stations are able to place and receive calls for any MC-MAP mobile station.
2. “Base station” refers to the functions performed on the land side, which are typically distributed among a cell, a sector of a cell, and a mobile switching center.
3. “Shall” and “shall not” identify requirements to be followed strictly to conform to the standard and from which no deviation is permitted. “Should” and “should not” indicate that one of several possibilities is recommended as particularly suitable, without mentioning or excluding others, that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is discouraged but not prohibited. “May” and “need not” indicate a course of action permissible within the limits of the standard. “Can” and “cannot” are used for statements of possibility and capability, whether material, physical, or causal.
4. Unless indicated otherwise, this Standard presents numbers in decimal form. Binary numbers are distinguished in the text by the use of single quotation marks.
5. Where text from the 3GPP2 C.S000x-A series is modified, the following conventions are used: Section headers reference the appropriate part of 3GPP2 C.S000x-A. Ellipsis [...] indicate blocks of unchanged text. Fixed underlining/~~strikethough~~ marking shows changes to existing text from the 3GPP2 C.S000x-A series.

NOTES

1 No text

REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. ANSI and TIA maintain registers of currently valid national standards published by them.

3GPP Standards:

1. TS22.002: *Universal Mobile Telecommunications System; Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN).*
2. TS22.011: *Universal Mobile Telecommunications System; Service accessibility.*
3. TS22.060: *Universal Mobile Telecommunications System; General Packet Radio Service (GPRS); Service Description; Stage 1.*
4. TS23.003: *Universal Mobile Telecommunications System; Numbering, addressing and identification.*
5. TS23.014: *Universal Mobile Telecommunications System; Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system.*
6. TS23.060: *Universal Mobile Telecommunications System; General Packet Radio Service (GPRS); Service Description; Stage 2.*
7. TS23.071: *Universal Mobile Telecommunications System; Location Services; Functional description Stage 2.*
8. TS23.022: *Universal Mobile Telecommunications System; Functions related to Mobile Station (MS) in idle mode.*
9. TS24.007: *Universal Mobile Telecommunications System; Mobile radio interface signalling layer 3; General aspects.*
10. TS24.008: *Universal Mobile Telecommunications System; Mobile radio interface layer 3 specification, Core Network Protocols - Stage 3.*
11. TS24.010: *Digital cellular telecommunications system ; Mobile radio interface layer 3 Supplementary services specification; General aspects.*
12. TS24.071: *Universal Mobile Telecommunications System; Mobile radio interface layer 3 location services specification.*
13. TS24.080: *Universal Mobile Telecommunications System; Mobile radio interface layer 3 supplementary services specification; Formats and coding.*
14. TS24.081: *Universal Mobile Telecommunications System; Line identification supplementary services - Stage 3.*
15. TS24.082: *Universal Mobile Telecommunications System; Call Forwarding (CF) supplementary services - Stage 3.*

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16. TS24.083: *Universal Mobile Telecommunications System; Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3.*

17. TS24.084: *Universal Mobile Telecommunications System; MultiParty (MPTY) supplementary services - Stage 3.*

18. TS24.085: *Universal Mobile Telecommunications System; Closed User Group (CUG) supplementary services - Stage3.*

19. TS24.086: *Universal Mobile Telecommunications System; Advice of Charge (AoC) supplementary services - Stage 3.*

20. TS25.331: *Universal Mobile Telecommunications System; RRC Protocol Specification.*

21. TS27.001: *Universal Mobile Telecommunications System; General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS).*

22. TS29.002: *Universal Mobile Telecommunications System; Mobile Application Part (MAP) specification.*

23. TS29.007: *Universal Mobile Telecommunications System; General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN).*

24. TS31.102: *Universal Mobile Telecommunications System; Characteristics of the USIM Application.*

ETSI Standards:

1. GSM01.02: *Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN).*

2. GSM01.04: *Digital cellular telecommunications system (Phase2+); Abbreviations and acronyms.*

3. GSM02.03: *Digital cellular telecommunications system (Phase2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN).*

4. GSM02.09: *Digital cellular telecommunications system (Phase 2+); Security aspects.*

5. GSM02.17: *Digital cellular telecommunications system (Phase 2+); Subscriber identity modules Functional characteristics.*

6. GSM02.40: *Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications.*

7. GSM03.01: *Digital cellular telecommunications system (Phase2+); Network functions.*

8. GSM03.13: *Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system.*

9. GSM03.20: *Digital cellular telecommunications system (Phase 2+); Security related network functions.*

REFERENCES

10. GSM 03.64: *Digital cellular telecommunications system (Phase2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2.*
11. GSM04.02: *Digital cellular telecommunications system (Phase2+); GSM Public Land Mobile Network (PLMN) access reference configuration.*
12. GSM04.03: *Digital cellular telecommunications system (Phase2+); Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities.*
13. GSM04.04: *Digital cellular telecommunications system (Phase 2+); layer 1; General requirements.*
14. GSM04.05: *Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer; General aspects.*
15. GSM04.06: *Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification.*
16. GSM04.08: *Digital cellular telecommunications system (Phase 2+);Mobile radio interface layer 3 specification.*
17. GSM04.11: *Digital cellular telecommunications system (Phase2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface.*
18. GSM04.12: *Digital cellular telecommunications system (Phase2+); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface.*
19. GSM 04.60: *Digital cellular telecommunications system (Phase2+); General Packet Radio Service (GPRS); Mobile Station - Base Station System (MS-BSS) interface; Radio Link Control and Medium Access Control (RLC/MAC) layer specification.*
20. GSM04.65: *Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP).*
21. GSM04.88: *Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 3.*
22. GSM05.02: *Digital cellular telecommunications system (Phase2+); Multiplexing and multiple access on the radio path.*
23. GSM05.05: *Digital cellular telecommunications system (Phase2+); Radio transmission and reception.*
24. GSM05.08: *Digital cellular telecommunications system (Phase2+); Radio subsystem link control.*
25. GSM05.10: *Digital cellular telecommunications system (Phase2+); Radio subsystem synchronization.*
26. GSM11.10: *Digital cellular telecommunications system (Phase2+); Mobile Station (MS) conformity specification.*
27. GSM11.11: *Digital cellular telecommunications system (Phase2+); Specification of the*

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Subscriber Identity Module - Mobile Equipment (SIM - ME) interface.

28. GSM11.21: *Digital cellular telecommunications system (Phase2); The GSM Base Station System (BSS) equipment specification.*

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

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

3GPP2 Standards:

1. C.S0001-A, *Introduction to cdma2000 Standards for Spread Spectrum Systems*

2. C.S0002-A, *Physical Layer Standard for cdma2000 Standards for Spread Spectrum Systems*

3. C.S0003-A, *Medium Access Control (MAC) Standard for cdma2000 Standards for Spread Spectrum Systems*

4. C.S0004-A, *Signaling Link Access Control (LAC) Standard for cdma2000 Standards for Spread Spectrum Systems*

5. C.S0005-A, *Upper Layer (Layer 3) Signaling Standard for cdma2000 Standards for Spread Spectrum Systems*

6. C.S0010, *Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Spread Spectrum Mobile Stations.*

7. C.S0011, *Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Mobile Stations.*

8. C.R1001, *Administration of Parameter Value Assignments for TIA/EIA Spread Spectrum Standards, November 1999.*

ITU Recommendations:

1. ITU-T Recommendation E.163: *Numbering plan for the international telephone service.*

2. ITU-T Recommendation E.164: *Numbering plan for the ISDN era.*

3. ITU-T Recommendation E.212: *Identification plan for land mobile stations.*

4. ITU-T Recommendation F.69 (1993): *Plan for telex destination codes.*

5. ITU-T Recommendation I.330: *ISDN numbering and addressing principles.*

6. ITU-T Recommendation I.440 (1989): *ISDN user-network interface data link layer - General aspects.*

7. ITU-T Recommendation I.450 (1989): *ISDN user-network interface layer 3 General aspects.*

8. ITU-T Recommendation I.500 (1993): *General structure of the ISDN interworking recommendations.*

REFERENCES

9. ITU-T Recommendation T.50: *International Alphabet No. 5.*

10. ITU-T Recommendation Q.931: *ISDN user-network interface layer 3 specification for basic control.*

11. ITU-T Recommendation V.21: *300 bits per second duplex modem standardized for use in the general switched telephone network.*

12. ITU-T 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.*

13. ITU-T 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.*

14. ITU-T Recommendation V.23: *600/1200-baud modem standardized for use in the general switched telephone network.*

15. ITU-T 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.*

16. ITU-T 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.*

17. ITU-T Recommendation V.110: *Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network.*

18. ITU-T Recommendation V.120: *Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing.*

19. ITU-T Recommendation X.21: *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks.*

20. ITU-T 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.*

21. ITU-T 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.*

22. ITU-T 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).*

23. ITU-T Recommendation X.31: *Support of packet mode terminal equipment by an ISDN.*

REFERENCES

24. ITU-T 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.*

25. ITU-T Recommendation X.75 (1988): *Packet-switched signalling system between public networks providing data transmission services.*

26. ITU-T Recommendation X.121: *International numbering plan for public data networks.*

Other Standards:

1. *Common Cryptographic Algorithms.* An EAR-controlled document subject to restricted distribution. Contact the Telecommunications Industry Association, Arlington, VA, October 1998.

2. ISO/IEC 646 (1991): *Information technology - ISO 7-bit coded character set for information interchange.*

3. ISO/IEC 6429: *Information technology - Control functions for coded character sets.*

4. ISO 8348 (1987): *Information processing systems - Data communications - Network service definition.*

5. ISO/IEC10646: *Universal Multiple-Octet Coded Character Set (UCS); UCS2, 16 bit coding.*

6. IETF RFC 1034: *Domain names - Concepts and Facilities (STD 7).*

1 Introduction

This specification defines changes to Multi-Carrier (MC) CDMA (1X and 3X modes) needed to support operation with a core network that uses a version of the Global System for Mobile communications (GSM) Mobile Application Part (MAP). This mode of operation is known as MC over GSM MAP, or MC-MAP. Core network protocols, air interface Connection Management (CM) and Mobility Management (MM), and procedures are as defined by 3GPP.

1.1 Architecture

Figure 1.1-1 shows the network architecture of the CDMA MC radio access network, which supports connection to the GSM-MAP core network.

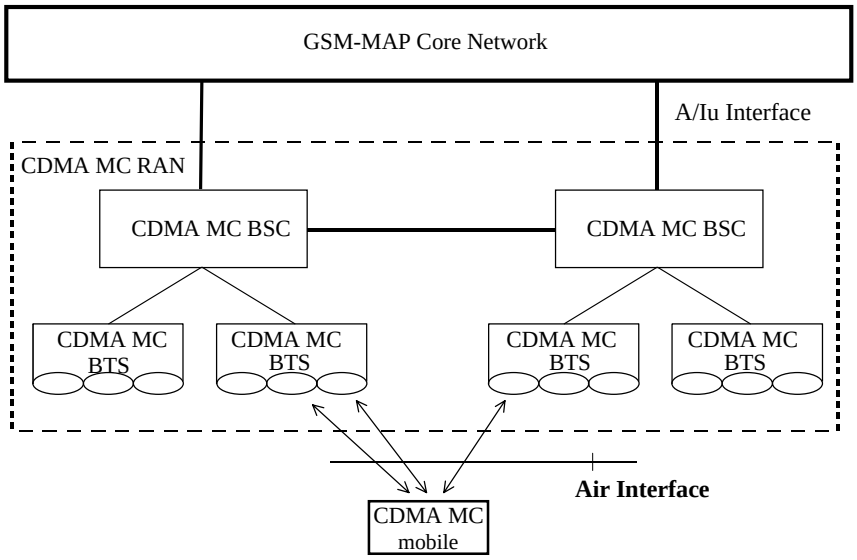

Figure 1.1-1. MC-MAP Radio Access Network Architecture

MC-MAP mobiles shall support connection to the GSM-MAP core network and shall support a Subscriber Identity Module (SIM)/UMTS Subscriber Identity Module (USIM).

Figure 1.1-2 shows the protocol stack for GSM-CDMA MC signaling.

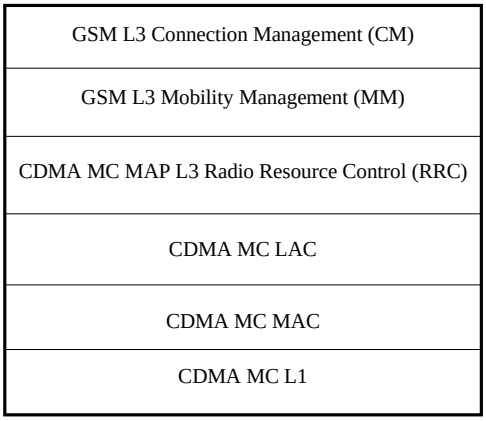

Figure 1.1-2. MC-MAP Protocol Stack

There are two groups of protocols in the evolved GSM-MAP network. Non-Access Stratum (NAS) protocols are terminated in the core network and include functionality related to mobility management and service aspects of the system. Access Stratum protocols are terminated in the radio access networks and are responsible for the radio interface aspects of the system.

The CDMA MC protocol stack plays the role of the access stratum protocols and is extended to support upper GSM-MAP non-access stratum protocols (GSM RIL3 MM and CM, as defined in the 3GPP 24.0XX series.)

1.2 Terms

Terms defined in 3GPP2 C.S000X-A are not mentioned here. Terms specific to 3GPP and used verbatim are mentioned with reference to appropriate 3GPP document that defines them. Terms specific to this document are defined here.

1.2.1 Definitions

3GPP. Third Generation Partnership Project (1).
3GPP2. Third Generation Partnership Project 2.
ANSI. American National Standards Institute.
Base Station Controller (BSC). The intelligent section of the Base Station.
Base Transceiver System (BTS). The radio section of the Base Station
BSC. See Base Station Controller.
BTS. See Base Transceiver System.
Call Control (CC). See TR21.905
CC. See Call Control.
CM. See Connection Management.
Connection Management (CM). See TR21.905. CM includes Call Control (CC), Supplementary Services (SS), and Short Message Services (SMS).
ETSI. European Telecommunications Standards Institute.
IMEI. See International Mobile Equipment Identity.
International Mobile Equipment Identity (IMEI). A number used to uniquely identify a mobile station in GSM.
ITU. International Telecommunications Union.
MAP. Mobile Application Part.
MAP-TMSI. MAP Temporary Mobile Station Identity. It has the structure similar to TMSI defined in TR21.905.
MM. See Mobility Management.
Mobility Management (MM). The ability to provide voice, data and location services to a user with mobility.
NAS. See Non-Access Stratum.
Non-Access Stratum (NAS). See TR21.905
RAB. See Radio Access Bearer.

Radio Access Bearer (RAB). See TR21.905
Radio Access Network (RAN). A network architecture element comprising the Base Station Controller and the Base Transceiver System.
RB. See Radio Bearer.
Radio Bearer (RAB). See TR21.905
Radio Resource (RR). See TR21.905
Radio Resource Control (RRC). See TR21.905
RAN. See Radio Access Network.
RR. See Radio Resource.
RRC. See Radio Resource Control.
R-TMSI. Radio Temporary Mobile Station Identity. It has the structure similar to TMSI defined in 3GPP2 C.S0005-A.
SAPI. Service Access Point Identifier.
SIM. See Subscriber Identity Module.
Subscriber Identity Module (SIM). A smart card as defined by GSM 11.11. The SIM contains subscriber-specific information and performs security functions in GSM MAP networks.
TIA. Telecommunications Industry Association.
UMTS. Universal Mobile Telecommunication System.
USIM. UMTS Subscriber Identity Module. A SIM evolved to support 3G services in GSM MAP networks. See the 3GPP 31.xxx series.

No Text

2 Modifications to C.S0001-A, *Introduction to cdma2000 Standards for Spread Spectrum Systems*

3GPP2 C.S0001-A provides an introduction to the cdma2000 standards. The few modifications that are given below are required to indicate that the standards are applicable to MAP networks using the modifications in this standard.

Section 1.1 of 3GPP2 C.S0001-A is modified as follows:

2.1 The cdma2000 Family of Standards

The cdma2000 family of standards specifies a spread spectrum radio interface that uses Code Division Multiple Access (CDMA) technology to meet the requirements for 3G wireless communication systems. The standards in the family are:

C.S0001-A~~IS-2000-1~~ *Introduction to cdma2000 Standards for Spread Spectrum Systems*

C.S0002-A~~IS-2000-2~~ *Physical Layer Standard for cdma2000 Spread Spectrum Systems*

C.S0003-A~~IS-2000-3~~ *Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems*

C.S0004-A~~IS-2000-4~~ *Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems*

C.S0005-A~~IS-2000-5~~ *Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems*

The above standards provide the CDMA Multi-Carrier mode, IMT-2000 CDMA MC, of the ITU IMT-2000 standards. Upper layer support is provided for the TIA/EIA-41 network, resulting in the MC-41 mode of operation. The cdma2000 system also includes a standard that specifies modifications that are required to support operation using the MAP Upper Layers, resulting in the MC-MAP mode of operation:

C.S9003 cdma2000 Multi-Carrier on GSM MAP (MC-MAP) Standard for Spread Spectrum Systems

In addition, the family includes a standard that specifies analog operation, to support dual-mode mobile stations and base stations:

C.S0006-A~~IS-2000-6~~ *Analog Signaling Standard for cdma2000 Spread Spectrum Systems*

Throughout the remainder of this document, use of the term cdma2000 refers to the cdma2000 family of standards.

1 No text.

3 Modifications to C.S0002-A, *Physical Layer Standard for cdma2000 Standards for Spread Spectrum Systems*

3GPP2 C.S0002-A uses a permutation of the bits of the ESN for the Public Long Code Mask. MC-MAP will use the TMSI or a mask supplied by the base station, which does not depend on the availability of ESN. This requires the following deltas to 3GPP2 C.S0002-A (note that the ESN option is not required for MC-MAP).

Note: Where text from the 3GPP2 C.S000x-A series is modified, section headers reference the appropriate part of 3GPP2 C.S000x-A. Ellipsis […] indicate blocks of unchanged text.

1.1 Terms

[…]

Public Long Code Mask. The long code mask used to form the public long code. The mask contains a permutation of the mobile station's ESN, ~~and~~ the TMSI, or the particular mask specified by the base station. The mask also includes the channel number when used for a Supplemental Code Channel. See also Private Long Code Mask and Long Code.

[…]

2.1.3.1.11 Direct Sequence Spreading

[…]

For the public long code mask, bits $M_{3\sim6}$ through M_0 shall be specified by PLCM_37 (see 2.3.6 of 3GPP2 C.S0005-A). Bits M_{41} through M_{37} shall be set to '11000'. The resulting public long code mask is shown in Figure 2.1.3.1.11-2. ~~shall be set to a permutation of the mobile station's ESN as follows:~~

~~ESN = $(E_{31}, E_{30}, E_{29}, E_{28}, E_{27}, E_{26}, E_{25}, \ldots E_2, E_1, E_0)$~~

~~Permuted ESN = $(E_0, E_{31}, E_{22}, E_{13}, E_4, E_{26}, E_{17}, E_8, E_{30}, E_{21}, E_{12}, E_3, E_{25}, E_{16}, E_7, E_{29}, E_{20}, E_{11}, E_2, E_{24}, E_{15}, E_6, E_{28}, E_{19}, E_{10}, E_1, E_{23}, E_{14}, E_5, E_{27}, E_{18}, E_9)$.~~

~~Bits M_{41} through M_{32} shall be set to '1100011000'. The resulting public long code mask is shown in Figure 2.1.3.1.11-2.~~

The private long code mask (See Fig. 2.1.3.1.11-3) shall be as follows: M_{41} through M_{40} shall be set to '01'. M_{39} through M_0 shall be the 40 least significant bits of the Voice Privacy Mask (VPM) generated by the Key_VPM_Generation procedure. M_0 of the private long code mask shall be the least significant bit of the VPM. The private long code mask is not to be changed during a call. See *Common Cryptographic Algorithms* for details of the Key_VPM_Generation procedure.

When a mobile station is transmitting on the Reverse Fundamental Channel or the Reverse Supplemental Code Channel, the mobile station shall use one of the following two long code masks unique to each channel: ~~A~~a public long code mask ~~unique to the mobile station's ESN~~ or a private long code mask. The Reverse Fundamental Channel shall be assigned the channel number 0. Each of the n - 1 Reverse Supplemental Code Channels shall be assigned the numbers 1 through n - 1. Bits M_{39} through M_{37} of the public or private long code mask for assigned code channel i, $0 \le i \le n - 1 \le NUM\_REV\_CODES_S$, shall be bit-by-bit XORed with the binary ~~value~~ representation of i.

[…]

41 ... 33	32 ... 28	27 ... 25	24 ... 9	8 ... 0
110001111	ACN	PCN	BASE_ID	PILOT_PN

ACN - Access Channel Number
PCN - Paging Channel Number
BASE_ID - Base station identification
PILOT_PN - Pilot PN sequence offset index for the Forward CDMA Channel

a) Access Channel Long Code Mask

41 40	39 ... 37	36 ... 0
11	Code Channel Index (i)	PLCM_37

Code Channel Index (i):
'000': Reverse Fundamental Channel,
'001' - '111': Reverse Supplemental Code Channel i, (i = 1,...,7)

b) Public Long Code Mask for the Reverse Fundamental Channel and the Reverse Supplemental Code Channels with Radio Configurations 1 and 2

Figure 2.1.3.1.11-2. Long Code Mask Format for Direct Sequence Spreading

41 40	39 ... 0
01	40 LSBs of VPM

Figure 2.1.3.1.11-3. Private Long Code Mask

2.1.3.1.12 Quadrature Spreading

[…]

When transmitting on the Reverse Common Control Channel while in Designated Access Mode, the mobile station shall use one of the following three long code masks designated by the base station: ~~A~~ a public long code mask ~~unique to the mobile station's ESN~~(see Figure 2.1.3.1.12-1), a private long code mask (see Figure 2.1.3.1.11-3), or a scheduled common long code mask. The public and private long code masks shall be as specified in 2.1.3.1.11. The scheduled common long code mask shall be as follows: bits M_{41} through M_{33} shall be set to '110001101'; bits M_{32} through M_{28} shall be set to the Reverse Common Control Channel number chosen; bits M_{27} through M_{25} shall be set to the code channel number for the associated Forward Common Control Channel (the range is 1 through 7); bits M_{24} through M_9 shall be set to $BASE\_ID_s$ for the current base station; and bits M_8 through M_0 shall be set to $PILOT\_PN_s$ for the current CDMA Channel (see Figure 2.1.3.1.12-2).

When transmitting on the Reverse Traffic Channel, the mobile station shall use one of the following two long code masks: ~~A~~ a public long code mask ~~unique to the mobile station's ESN~~ (see Figure 2.1.3.1.12-1) or a private long code mask (see Figure 2.1.3.1.11-3). The public and private long code masks shall be as specified in 2.1.3.1.11.

[…]

3.1.3.10.7 Forward Dedicated Control Channel Data Scrambling

The Forward Dedicated Control Channel shall be scrambled as specified in 3.1.3.1.9. The public long code mask shall be as shown in Figure 3.1.3.10.7-1. ~~The permutation of the ESN bits in the public long code mask shall be as specified in 2.1.3.12.~~ The generation of the private long code mask shall be as specified in 2.1.3.1.12.

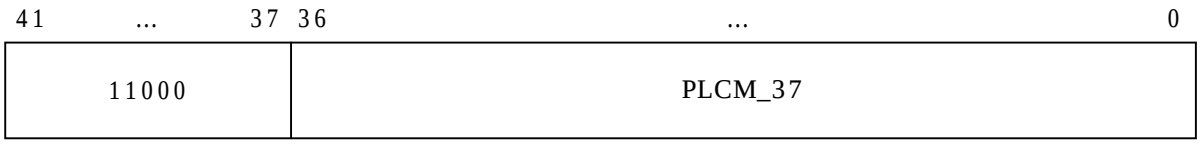

Figure 3.1.3.10.7-1. Forward Dedicated Control Channel Public Long Code Mask

3.1.3.11.7 Forward Fundamental Channel Data Scrambling

The Forward Fundamental Channel data shall be scrambled as specified in 3.1.3.1.9. The public long code mask shall be as shown in Figure 3.1.3.11.7-1. ~~The permutation of the ESN bits in the public long code mask shall be as specified in 2.1.3.12.~~ The generation of the private long code mask shall be as specified in 2.1.3.1.12.

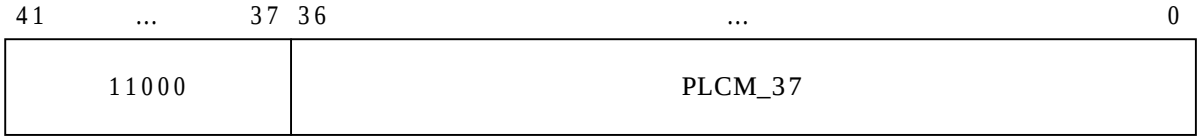

Figure 3.1.3.11.7-1. Forward Fundamental Channel Public Long Code Mask

3.1.3.12.7 Forward Supplemental Channel Data Scrambling

The data for Forward Supplemental Channels shall be scrambled as specified in 3.1.3.1.9. The same long code mask is used for all code channels of the Forward Traffic Channel. The public long code mask shall be as shown in Figure 3.1.3.12.7-1. ~~The permutation of the ESN bits in the public long code mask shall be as specified in 2.1.3.12.~~ The generation of the private long code mask shall be as specified in 2.1.3.1.12.

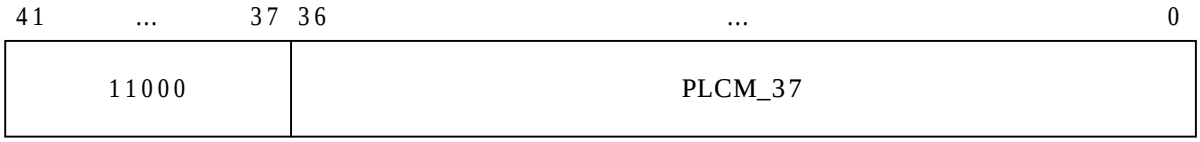

Figure 3.1.3.12.7-1. Forward Supplemental Channel Public Long Code Mask

3.1.3.13.7 Forward Supplemental Code Channel Data Scrambling

The data for Forward Supplemental Code Channels shall be scrambled as specified in 3.1.3.1.9. The same long code mask is used for all code channels of the Forward Traffic Channel. The public long code mask shall be as shown in Figure 3.1.3.13.7-1. ~~The permutation of the ESN bits in the public long code mask shall be as specified in 2.1.3.12.~~ The generation of the private long code mask shall be as specified in 2.1.3.1.12.

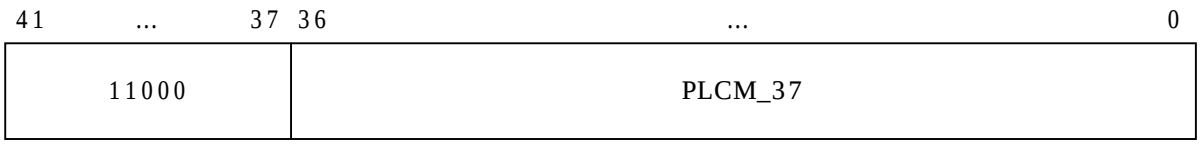

Figure 3.1.3.13.7-1. Forward Supplemental Code Channel Public Long Code Mask

4 Modifications to C.S0003-A, *Medium Access Control (MAC) Standard for cdma2000 Standards for Spread Spectrum Systems*

No changes required.

1 No text.

5 Modifications to C.S0004-A, *Signaling Link Access Control (LAC) Standard for cdma2000 Standards for Spread Spectrum Systems*

Figure 5-1 shows the architecture for the MC-MAP LAC on the forward logical channels, and Figure 5-2 shows the architecture for the MC-MAP LAC on the reverse logical channels. Figure 5-3 illustrates how data units are processed in each of the LAC sublayers.

To support MC-MAP operations, an Enhanced Services Sublayer is added on the forward dedicated signaling channel (f-dsch) and the reverse dedicated signaling channel (r-dsch) to the architecture described in 3GPP2 C.S0004-A. The Enhanced Services Sublayer is not used with RR messages nor MC-41 mobile stations.

The functions and procedures for the Authentication Sublayer, ARQ Sublayer, Addressing Sublayer, Utility Sublayer and the SAR Sublayer are described in 3GPP2 C.S0004-A. When operating with an MC-MAP mobile station, the Authentication Sublayer is disabled, as the authentication services are provided at the MAP Layer 3 level. The ARQ sublayer is unmodified for MC-MAP operations. To support MC-MAP operations, MAP-type addresses are added to the addressing sublayer. The modifications to 3GPP2 C.S0004-A required to provide the functionality of 3GPP2 C.S0004-A in MC-MAP mode of operation are described in 5.1.

The Enhanced Services and the modifications to 3GPP2 C.S0004-A required to provide these services in MC-MAP mode of operation are described in 5.2.

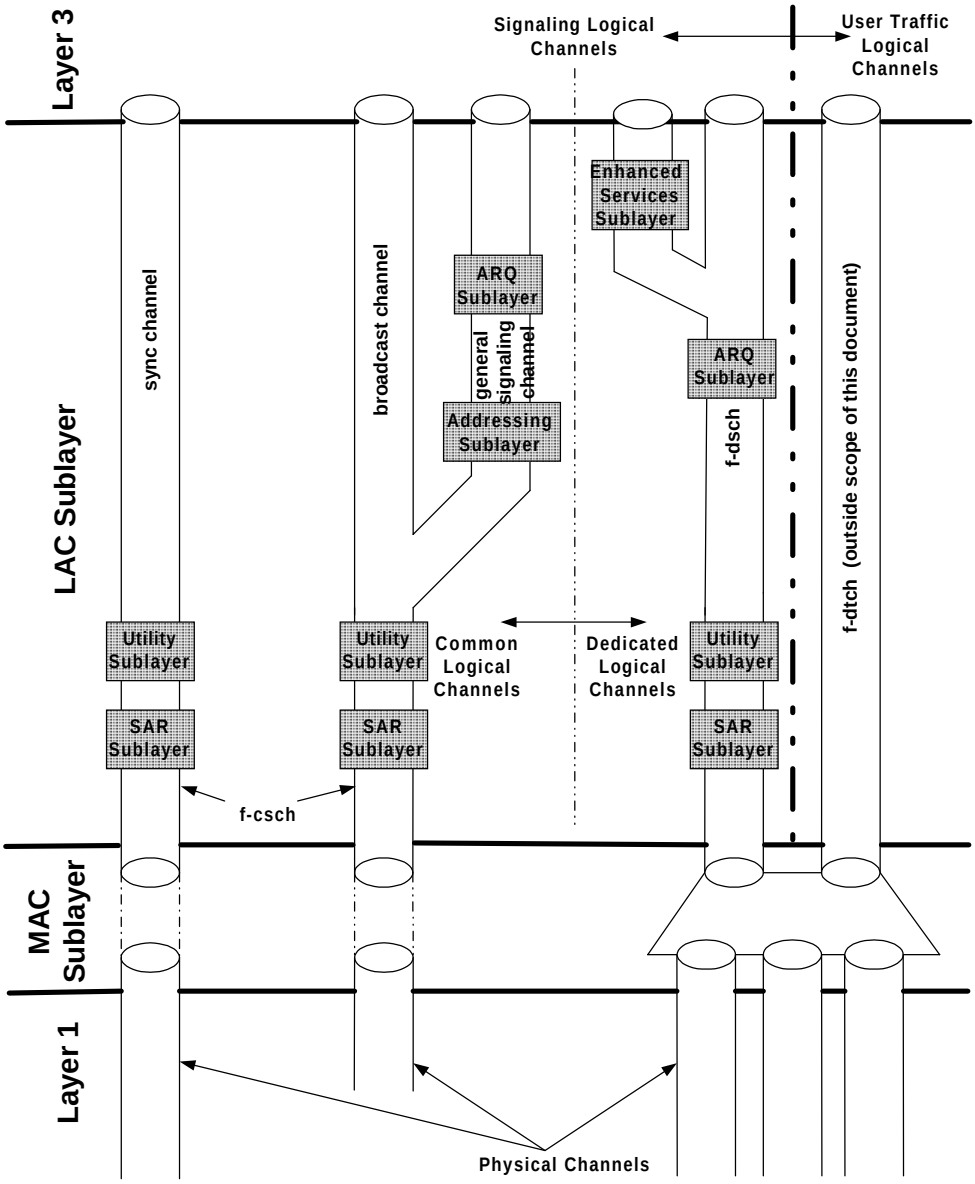

Figure 5-1. Forward Logical Channel Architecture for MC-MAP

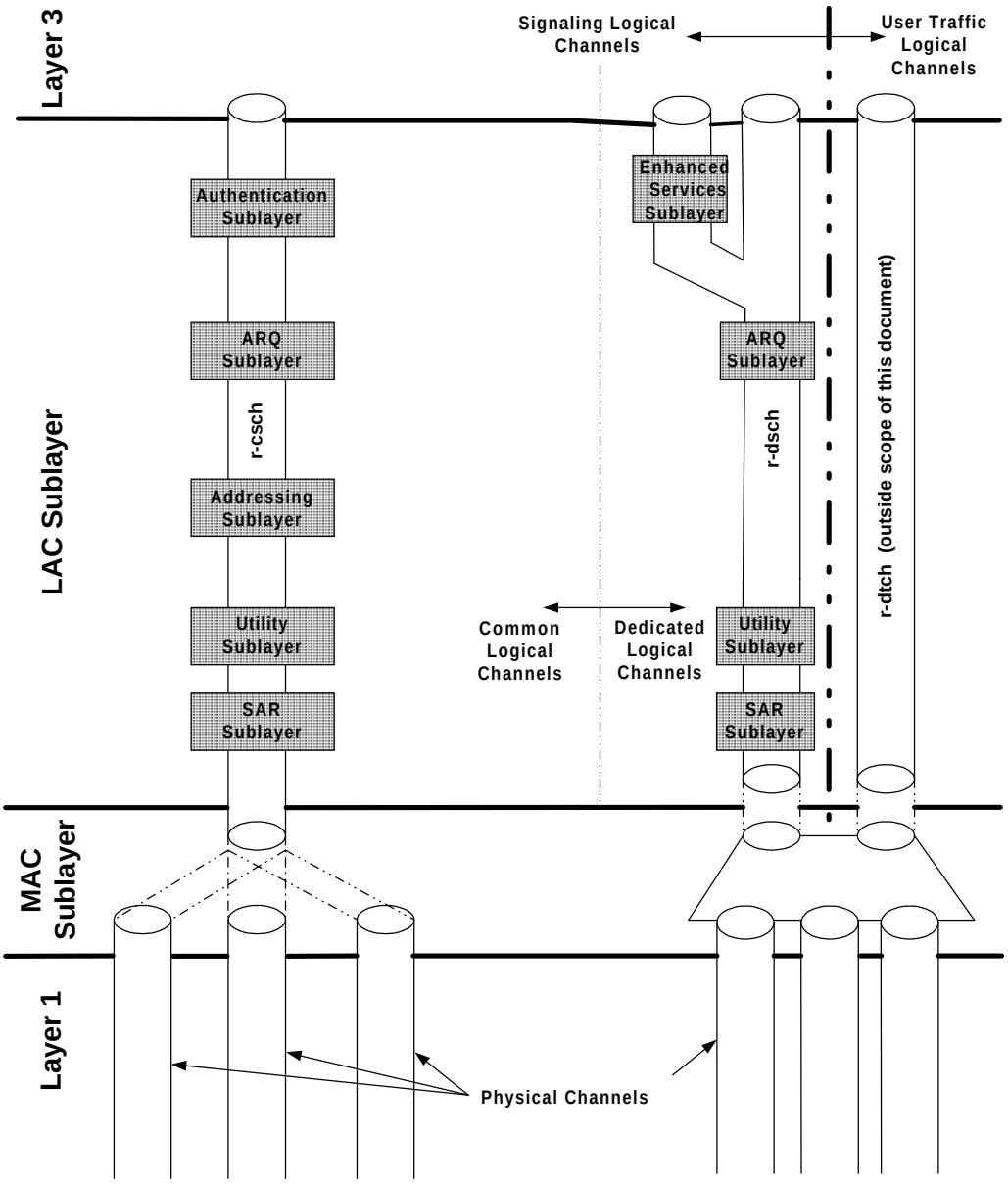

Figure 5-2. Reverse Logical Channel Architecture for MC-MAP

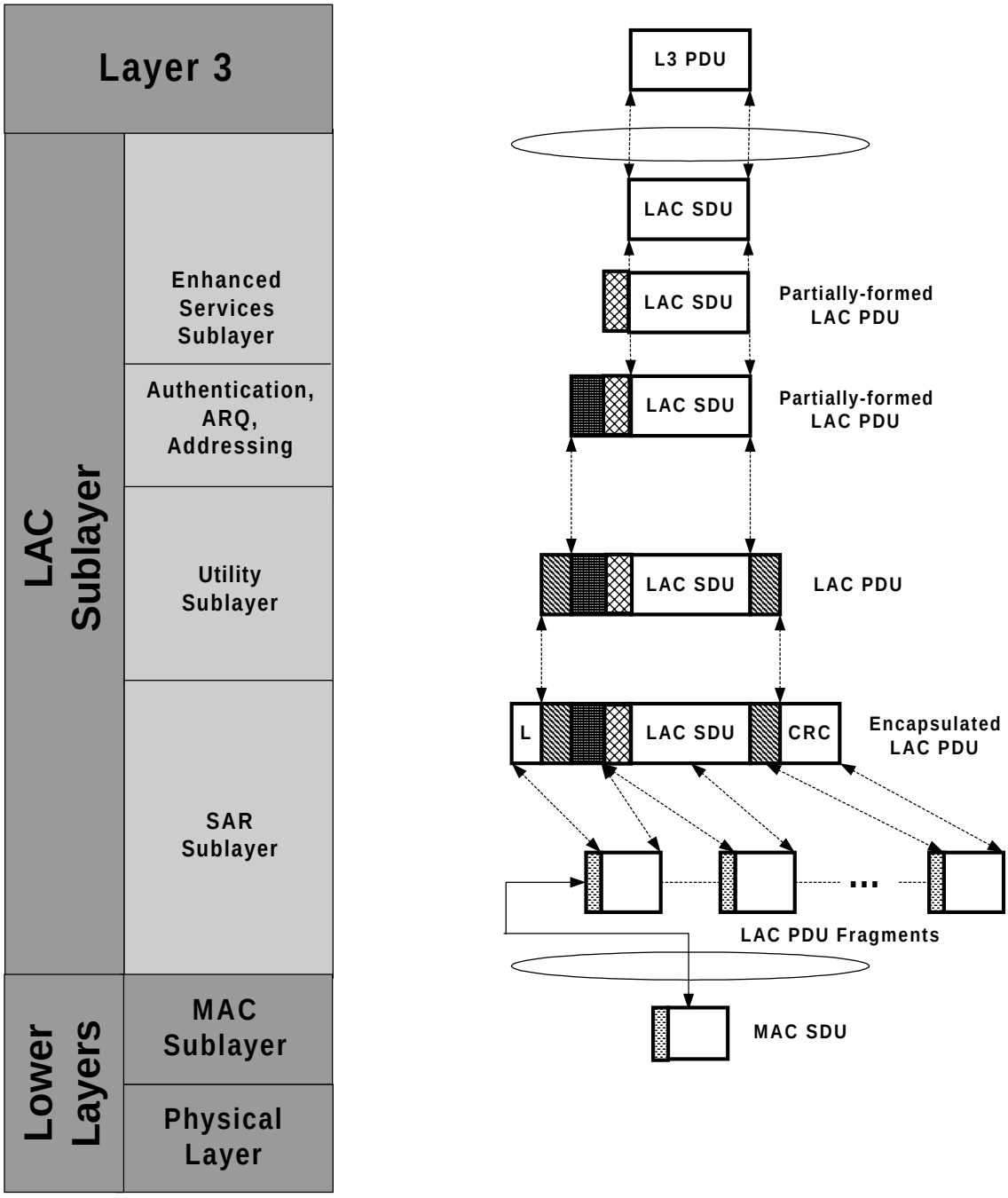

Figure 5-3. Data Unit Processing for MC-MAP LAC

5.1 Modifications to Existing Sections of 3GPP2 C.S0004-A

5.1.1 Additions to 1.1.2 of 3GPP2 C.S0004-A

ASSIGN_LAC$_{s-p}$ – A 16 bit Location Area Code assigned to mobile station.

ASSIGN_RAC$_{s-p}$ – A 16 bit Routing Area Code assigned to mobile station.

ASSIGNING_R_TMSI_ZONE_LEN$_s$ – The 4-bit assigning R_TMSI zone length.

ASSIGNING_R_TMSI_ZONE$_S$ – The 8-octet assigning TMSI zone length.
MAP-TMSI$_{S-P}$ – A 4-octet MAP-TMSI that uniquely identifies the mobile station within the assigned Location Area assigned by the circuit switched core network.
MAP-P-TMSI$_{S-P}$ – A 4-octet MAP-TMSI that uniquely identifies the mobile station within the assigned Location Area assigned by the packet switched core network.
MNC_O$_S$ – The Mobile Network Code of IMSI_O.
R_TMSI_CODE$_S$ – The 4-octet R_TMSI code that uniquely identifies the mobile station with the assigning R_TMSI zone.
R_TMSI_USED$_S$ – Base station's preference of the use of R_TMSI.
R_TMSI_ZONE$_S$ – The R_TMSI zone number of the base station, from 1 to 8 octets in length.
R_TMSI_ZONE_LEN$_S$ – The number of octets in TMSI zone.

5.1.2 Changes to Section 2.1.1.1.1.2 of 3GPP2 C.S0004-A

The mobile station shall set AUTH_MODE to '00'.

5.1.3 Changes to Section 2.1.1 of 3GPP2 C.S0004-A

5.1.3.1 Changes to Section 2.1.1.3.1.1 of 3GPP2 C.S0004-A

Table 2.1.1.3.1.1-1 is modified as follows:

Table 2.1.1.3.1.1-1. Address Types

Description	MSID_TYPE (binary)	MSID_LEN (octets)
IMSI_S and ESN (Band Class 0 only)	000	9
ESN	001	4
IMSI	010	5 to 7
IMSI and ESN	011	9 to 11
TMSI	101	2 to 12
R-TMSI	110	2 to 12
MC-MAP Address	111	5 to 10
~~All other MSID_TYPE values are reserved.~~		

The MSID field for MSID_TYPE equal to '110' and '111' are defined as follows:

If MSID_TYPE is equal to '110', the MSID field consists of the following subfields:

Subfield	Length (bits)
R_TMSI_ZONE	If MSID_LEN is greater than four, 8 × (MSID_LEN - 4); otherwise, 0.
R_TMSI_CODE_ADDR	If MSID_LEN is greater than four, 32; otherwise, 8 × MSID_LEN.

If MSID_TYPE is equal to '111', the MSID field consists of the following subfields:

Subfield	Length (bits)
MC_MAP_ADDR_TYPE	4
MC-MAP-specific subfields	4 + 8 × (MSID_LEN - 1)

For MSID_TYPE equal to '111', additional addressing parameters are represented in Table 2.1.1.3.1.1-4.

Table 2.1.1.3.1.1-4. MC_MAP_ADDR_TYPE Address Types

Description	MC_MAP_ADDR_TYPE (binary)	Length of MC_MAP Type-specific Subfields (bits)
MAP-TMSI included	0000	36
MAP-TMSI and LAI included	0001	68
MAP-TMSI and RAI included	0010	76
IMEI included	0011	36
All other MC_MAP_ADDR_TYPE values are reserved		

The MCC, MNC, and LAC comprise the Location Area Identity (LAI) (see 4.1 of 3GPP TS 23.003); the MCC, MNC, LAC, and RAC comprise the Routing Area Identity (RAI).

If MC_MAP_ADDR_TYPE is equal to '0000', then MC-MAP-specific subfields consist of:

Subfield	Length (bits)
RESERVED	4
MAP_TMSI	32

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

If MC_MAP_ADDR_TYPE is equal to '0001', then MC-MAP-specific subfields consist of:

Subfield	Length (bits)
MCC	10
MNC	10
LAC	16
MAP_TMSI	32

MCC Mobile Country Code (see 2.3.1 of 3GPP2 C.S0005-A).

MNC Mobile Network Code (see 2.3.1.4 of 3GPP2 C.S0005-A).

LAC Location Area Code.

The LAC is coded as a binary number as described in 4.1 of 3GPP TS 23.003.

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

If MC_MAP_ADDR_TYPE is equal to '0010', then MC-MAP-specific subfields consist of:

Subfield	Length (bits)
MCC	10
MNC	10
LAC	16
RAC	8
MAP_TMSI	32

MCC Mobile Country Code (see 2.3.1 of 3GPP2 C.S0005-A).

MNC Mobile Network Code (see 2.3.1.4 of 3GPP2 C.S0005-A).

LAC Location Area Code.

The LAC is coded as a binary number as described in 4.1 of 3GPP TS 23.003.

RAC Routing Area Code.

The RAC is coded as a binary number as described in 4.2 of 3GPP TS 23.003.

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

If MC_MAP_ADDR_TYPE is equal to '0011', then MC-MAP-specific subfields consist of:

Subfield	Length (bits)
RESERVED	4
IMEI	60

IMEI International Mobile Equipment Identity.

The IMEI is coded as a sequence of 15 BCD digits as described in 6.2.1 of 3GPP TS 23.003.

5.1.3.2 Changes to Section 2.1.1.3.1.2 of 3GPP2 C.S0004-A (Requirements for Setting the Addressing Fields)

The MC-MAP mobile station shall ignore the requirements listed in 2.1.1.3.1.2 of 3GPP2 C.S0004-A. It shall determine and set the type of address to use for all PDUs sent on r-csch, as follows:

- The mobile station shall set MSID_TYPE to '010' and shall use the IMSI_O as the mobile station identifier if all of the following conditions are met:
  - The mobile station has been assigned an IMSI_T,
  - MAP-TMSIs-p or MAP-P-TMSIs-p has not been assigned or all four octets of MAP-TMSIs and MAP-P-TMSIs-p are equal to '1', and
  - R_TMSI_USEDs is equal to '0'.

  The mobile station shall include the following subfields in the MSID field:

  IMSI_CLASS — The mobile station shall set this field as specified in 2.1.1.3.1.3 of 3GPP2 C.S0004-A.

  IMSI class-specific subfields — IMSI class-specific subfields. The mobile station shall set these fields as specified in 2.1.1.3.1.3 of 3GPP2 C.S0004-A.

- The mobile station shall set MSID_TYPE to '101' and shall use the R-TMSI as the mobile station identifier if both of the following conditions are met:
  - $R\_TMSI\_USED_S$ is equal to '1';
  - The bits of $R\text{-}TMSI\_CODE_{S\text{-}P}$ are not all equal to '1'.

  The mobile station shall determine the value of the MSID_LEN field according to the procedure described in 2.1.1.3.1.2.1, and then the mobile station shall include the following subfields in the MSID subfields:

  R_TMSI_ZONE — If MSID_LEN is greater than four, the mobile station shall set this field to the $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ most significant octets of $ASSIGNING\_R\_TMSI\_ZONE_S$, the assigning R_TMSI zone. If MSID_LEN is less than or is equal to four, the mobile station shall omit this field.

  R_TMSI_CODE_ADDR — If R_TMSI_ZONE is included in the address, the mobile station shall set this field to the 32-bit R-TMSI code assigned to the mobile station.

If R_TMSI_ZONE is not included in the address, the mobile station shall set this field as follows:

1. If the most significant octet of the R_TMSI_CODE assigned to the mobile station is equal to '00000000', and if the second most significant octet of the R_TMSI_CODE assigned to the mobile station is not equal to '00000000', the mobile station shall set R_TMSI_CODE_ADDR to the 24 least significant bits of the R_TMSI_CODE assigned to the mobile station.
2. If the two most significant octets of the R_TMSI_CODE assigned to the mobile station are both equal to '00000000', the mobile station shall set R_TMSI_CODE_ADDR to the 16 least significant bits of the R_TMSI_CODE assigned to the mobile station.
3. In all other cases, the mobile station shall set R_TMSI_CODE_ADDR to the R_TMSI_CODE assigned to the mobile station.

- The mobile station shall set MSID_TYPE to '111' and MC_MAP_ADDR_TYPE to '0000', and shall use the MAP-TMSI as the mobile station identifier if all of the following conditions are met:
  - $R\_TMSI\_USED_s$ is equal to '0',
  - $MAP\text{-}TMSI_{s\text{-}p}$ or $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ has been assigned and all four octets of the corresponding TMSI are not equal to '1'.
  - $ASSIGN\_LAC_{s\text{-}p}$ is equal to LAC_s, or all 16 bits of $ASSIGN\_LAC_{s\text{-}p}$ are either '0' or '1'.
  - MNC_O_s is equal to MNC_s.
  - MCC_O_s is equal to MCC_s.
  - If $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ is assigned, and $MAP\text{-}TMSI_{s\text{-}p}$ is not assigned, $ASSIGN\_RAC_{s\text{-}p}$ is equal to RAC_s.

  The mobile station shall include the following MC-MAP-specific subfields:

  RESERVED — The mobile station shall set this field to '0000'.

  MAP-TMSI — The mobile station shall set this field to $MAP\text{-}TMSI_{s\text{-}p}$ if $MAP\text{-}TMSI_{s\text{-}p}$ is assigned; otherwise the mobile station shall set this field to $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$.

- The mobile station shall set MSID_TYPE to '111' and MC_MAP_ADDR_TYPE to '0001' and shall use the MAP-TMSI with LAI as the mobile station identifier if all of the following conditions are met:
  - $R\_TMSI\_USED_s$ is equal to '0'.
  - $MAP\text{-}TMSI_{s\text{-}p}$ has been assigned, and all four octets of $MAP\text{-}TMSI_{s\text{-}p}$ not equal to '1'.
  - $ASSIGN\_LAC_{s\text{-}p}$ is not equal to LAC_s, or MNC_O_s is not equal to MNC_s, or MCC_O_s is not equal to MCC_s.

  The mobile station shall include the following MC-MAP-specific subfields:

  MCC — The mobile station shall set this field to MCC_O_s.

MNC The mobile station shall set this field to MNC_O_S.

LAC The mobile station shall set this field to $ASSIGN\_LAC_{s-p}$.

MAP-TMSI The mobile station shall set this field to $MAP\text{-}TMSI_{s-p}$.

- The mobile station shall set MSID_TYPE to '111' and MC_MAP_ADDR_TYPE to '0010', and shall use the MAP_TMSI with RAI as the mobile station identifier if all of the following conditions are met:
  - $R\_TMSI\_USED_S$ is equal to '0'.
  - $MAP\text{-}TMSI_{s-p}$ is not assigned.
  - $MAP\text{-}P\text{-}TMSI_{s-p}$ has been assigned, and all four octets of $MAP\text{-}P\text{-}TMSI_{s-p}$ are not equal to '1'.
  - $ASSIGN\_RAC_{s-p}$ is not equal to RAC_S, or $ASSIGN\_LAC_{s-p}$ is not equal to LAC_S, or MNC_O_S is not equal to MNC_S, or MCC_O_S is not equal to MCC_S.

  The mobile station shall include the following MC-MAP-specific subfields:

  MCC The mobile station shall set this field to MCC_O_S.

  MNC The mobile station shall set this field to MNC_O_S.

  LAC The mobile station shall set this field to $ASSIGN\_LAC_{s-p}$.

  RAC The mobile station shall set this field to $ASSIGN\_RAC_{s-p}$.

  MAP-TMSI The mobile station shall set this field to $MAP\text{-}P\text{-}TMSI_{s-p}$.

- The mobile station shall set MSID_TYPE to '111' and MC_MAP_ADDR_TYPE to '0011' and shall use IMEI as the mobile station identifier if all of the following conditions are met:
  - $R\_TMSI\_USED_S$ is equal to '0'.
  - The mobile station has not been assigned a valid $MAP\text{-}TMSI_{s-p}$ or $MAP\text{-}P\text{-}TMSI_{s-p}$
  - The mobile station has not been assigned a valid IMSI_T.

  The mobile station shall include the following MC-MAP-specific subfields:

  RESERVED The mobile station shall set this field to '0000'.

  IMEI The mobile station shall set this field to its IMEI (see 6.2.1 of 3GPP TS 23.003).

5.1.3.3 Changes to Section 2.1.1.3.1.2.1 of 3GPP2 C.S0004-A (Value of MSID_LEN field)

If MSID_TYPE is not equal to '101' or '110', the mobile station shall set MSID_LEN to the number of octets included in MSID (see Table 2.1.1.3.1.1-1). If MSID_TYPE is equal to '110', the mobile station shall set MSID_LEN as follows:

- The mobile station shall set MSID_LEN to 4 (R_TMSI_CODE_ADDR is to include all four octets of R_TMSI_CODEs) if all of the following conditions are met:
  - $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ is equal to $R\_TMSI\_ZONE\_LEN_S$,
  - The least significant $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ octets of

– ASSIGNING_R_TMSI_ZONE$_S$ are equal to R_TMSI_ZONE$_S$.

– The most significant octet of R_TMSI_CODE$_S$ is not equal to '00000000'.

- The mobile station shall set MSID_LEN to 3 (R_TMSI_CODE_ADDR is to include the three least significant octets of R_TMSI_CODE$_S$) if all following conditions are met:

  – ASSIGNING_R_TMSI_ZONE_LEN$_S$ is equal to R_TMSI_ZONE_LEN$_S$,

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_S$ octets of ASSIGNING_R_TMSI_ZONE$_S$ are equal to R_TMSI_ZONE$_S$ and

  – The most significant octet of R_TMSI_CODE$_S$ is equal to '00000000'.

  – The next most significant octet of R_TMSI_CODE$_S$ is not equal to '00000000'.

- The mobile station shall set MSID_LEN to 2 (R_TMSI_CODE_ADDR is to include the two least significant octets of R_TMSI_CODEs) if all of the following conditions are met:

  – ASSIGNING_R_TMSI_ZONE_LEN$_S$ is equal to R_TMSI_ZONE_LEN$_S$,

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_S$ octets of ASSIGNING_R_TMSI_ZONE$_S$ are equal to R_TMSI_ZONE$_S$ and

  – The two most significant octets of R_TMSI_CODE$_S$ are both equal to '00000000'.

- The mobile station shall set MSID_LEN to 4 + ASSIGNING_R_TMSI_ZONE_LENs (R_TMSI_ZONE is to include the ASSIGNING_R_TMSI_ZONE_LENs least significant octets of ASSIGNING_R_TMSI_ZONEs while R_TMSI_CODE_ADDR is to include all four octets of R_TMSI_CODEs) if all of the following condition is met:

  – ASSIGNING_R_TMSI_ZONE_LEN$_S$ is not equal to R_TMSI_ZONE_LEN$_S$.

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_S$ octets of ASSIGNING_R_TMSI_ZONE$_S$ are not equal to R_TMSI_ZONE$_S$.

5.1.3.4 Changes to Section 2.1.1.4 of 3GPP2 C.S0004-A

The following entries are added to Table 2.1.1.4.1.1.2-1:

Message Name	MSG_TAG	MSG_ID (binary)
RR-level Registration Message	RRLRM	001101
MC-MAP Initial L3 Message	MAPIL3M	001110
MC-MAP L3 Message	MAPL3M	001111
MC-MAP RRC Connection Request Message	MAPCRM	010000
R-TMSI Assignment Completion Message	RTACM	010001

5.1.4 Changes to Section 2.1.2 of 3GPP2 C.S0004-A

5.1.4.1 Changes to Section 2.1.2.2.2.1 of 3GPP2 C.S0004-A (Page Match Procedure for the General Page Message)

The mobile station shall process the records in the *General Page Message* in the order they occur, using the following procedures:

- The mobile station shall ignore all remaining bits in the message if a page record has:
  - PAGE_CLASS equal to '01' and PAGE_SUBCLASS equal to '10' or '11', or
  - PAGE_CLASS equal to '11' and PAGE_SUBCLASS equal to '11', or
  - PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '10' and PAGE_SUBCLASS_EXT = '11'.
- The MC-MAP mobile station shall also ignore the remaining bits in the record if a page record has PAGE_CLASS equal to '01' or '10'.
- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '01' and PAGE_SUBCLASS_EXT is equal to '00', the mobile station shall declare a page match if all of the following conditions are met:
  - The bits of $R\_TMSI\_CODE_S$ are not all equal to '1'.
  - $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ is equal to $R\_TMSI\_ZONE\_LEN_S$.
  - The least significant $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ octets of $ASSIGNING\_R\_TMSI\_ZONE_S$ are equal to $R\_TMSI\_ZONE_S$.
  - $R\_TMSI\_CODE_S$ is equal to the R_TMSI_CODE_ADDR received in the page record.
- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '01' and PAGE_SUBCLASS_EXT is equal to '01', the mobile station shall declare a page match if all of the following conditions are met:
  - The bits of $R\_TMSI\_CODE_S$ are not all equal to '1'.
  - $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ is equal to $R\_TMSI\_ZONE\_LEN_S$.
  - The least significant $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ octets of $ASSIGNING\_R\_TMSI\_ZONE_S$ are equal to $R\_TMSI\_ZONE_S$.

– The most significant octet of R_TMSI_CODE$_S$ is equal to '00000000'.

– The least significant 24 bits of R_TMSI_CODE$_S$ are equal to the R_TMSI_CODE_ADDR received in the page record.

- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '01' and PAGE_SUBCLASS_EXT is equal to '10', the mobile station shall declare a page match if all of the following conditions are met:

  – The bits of R_TMSI_CODE$_S$ are not all equal to '1'.

  – ASSIGNING_R_TMSI_ZONE_LEN$_S$ is equal to R_TMSI_ZONE_LEN$_S$.

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_S$ octets of ASSIGNING_R_TMSI_ZONE$_S$ are equal to R_TMSI_ZONE$_S$.

  – The two most significant octets of R_TMSI_CODE$_S$ are both equal to '00000000'.

  – The least significant 16 bits of R_TMSI_CODE$_S$ are equal to the R_TMSI_CODE_ADDR received in the page record.

- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '01' and PAGE_SUBCLASS_EXT is equal to '11', the mobile station shall declare a page match if all of the following conditions are met:

  – The bits of R_TMSI_CODE$_S$ are not all equal to '1'.

  – ASSIGNING_R_TMSI_ZONE_LEN$_S$ is equal to the R_TMSI_ZONE_LEN received in the page record.

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_S$ octets of ASSIGNING_R_TMSI_ZONE$_S$ are equal to the R_TMSI_ZONE received in the page record.

  – R_TMSI_CODE$_S$ is equal to the R_TMSI_CODE_ADDR received in the page record.

- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '10' and PAGE_SUBCLASS_EXT is equal to '00', the mobile station shall declare a page match if any one of the following conditions is met:

  – The bits of MAP-TMSI$_{S\text{-}p}$ or MAP-P-TMSI$_{S\text{-}p}$ are not all equal to '1'.

  – Either MAP-TMSI$_{S\text{-}p}$ or MAP-P-TMSI$_{S\text{-}p}$ is equal to MAP-TMSI received in the page record.

  – ASSIGN_LAC$_{S\text{-}p}$ is equal to LAC$_S$.

  – MNC_O$_S$ is equal to MNC$_S$.

  – MCC_O$_S$ is equal to MCC$_S$.

  – If MAP-P-TMSI$_{S\text{-}p}$ is equal to MAP-TMSI received, ASSIGN_RAC$_{S\text{-}p}$ is equal to RAC$_S$.

- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '10' and PAGE_SUBCLASS_EXT is equal to '01', the mobile station shall declare a page match if all of the following conditions are met:

– The bits of MAP-TMSI$_{s\text{-}p}$ are not all equal to '1'.

– MAP-TMSI$_{s\text{-}p}$ is equal to MAP-TMSI received in the page record.

– ASSIGN_LAC$_{s\text{-}p}$ is equal to LAC received in the page record.

– MNC_O$_s$ is equal to MNC received in the page record.

– MCC_O$_s$ is equal to MCC received in the page record.

- If PAGE_CLASS is equal to '11', PAGE_SUBCLASS is equal to '10' and PAGE_SUBCLASS_EXT is equal to '10', the mobile station shall declare a page match if all of the following conditions are met:

  – The bits of MAP-P-TMSI$_{s\text{-}p}$ are not all equal to '1'.

  – MAP-P-TMSI$_{s\text{-}p}$ is equal to MAP-TMSI received in the page record.

  – ASSIGN_RAC$_{s\text{-}p}$ is equal to the RAC received in the page record.

  – ASSIGN_LAC$_{s\text{-}p}$ is equal to LAC received in the page record.

  – MNC_O$_s$ is equal to MNC received in the page record.

  – MCC_O$_s$ is equal to MCC received in the page record.

5.1.4.2 Addition to Section 2.1.2.2.2.2 of 3GPP2 C.S0004-A (Address Recognition Procedures for Messages other than the General Page Message)

The MC-MAP mobile station shall ignore the rest of the bits in the received PDU if the ADDR_TYPE is equal to '000' or '001' or '011'.

In additions to the procedures listed in 2.1.2.2.2.2 of 3GPP2 C.S0004-A, mobile station shall use the following procedures to determine an address match.

If the ADDR_TYPE is equal to '110' (the address is an R-TMSI address), the mobile station shall declare an address match if all of the following conditions are met:

- The bits of R_TMSI_CODEs are not all equal to '1', and the received ADDR_LEN is less than or equal to four:

  – ASSIGNING_R_TMSI_ZONE_LEN$_s$ is equal to R_TMSI_ZONE_LEN$_s$.

  – The least significant ASSIGNING_R_TMSI_ZONE_LEN$_s$ octets of ASSIGNING_R_TMSI_ZONE$_s$ are equal to R_TMSI_ZONE$_s$.

  – The received ADDRESS (R_TMSI_CODE_ADDR) is equal to the ADDR_LEN least significant octets of R_TMSI_CODE$_s$,.

  – Each of the four minus ADDR_LEN most significant octets of R_TMSI_CODE$_s$ are equal to '00000000'.

- The bits of R_TMSI_CODE$_s$ are not all equal to '1' and the received ADDR_LEN is greater than four:

  – The ASSIGNING_R_TMSI_ZONE_LEN$_s$ most significant octets of the received ADDRESS (R_TMSI_ZONE) are equal to the least significant ASSIGNING_R_TMSI_ZONE_LEN$_s$ octets of R_TMSI_ZONE$_s$.

  – ADDR_LEN minus four is equal to ASSIGNING_R_TMSI_ZONE_LEN$_s$.

– The least significant four octets of ADDRESS (R_TMSI_CODE_ADDR) are equal to $R\_TMSI\_CODE_s$.

If the ADDR_TYPE is equal to '111' (the address is an MC-MAP address), the mobile station shall use the following procedures:

- If the MC_MAP_ADDR_TYPE is equal to '0000', the mobile station shall declare an address match if all of the following conditions are met:
  - The bits of $MAP\text{-}TMSI_{s\text{-}p}$ or $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ are not all equal to '1'.
  - Either $MAP\text{-}TMSI_{s\text{-}p}$ or $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ is equal to MAP-TMSI received in MC_MAP_ADDR_TYPE specific subfield.
  - $ASSIGN\_LAC_{s\text{-}p}$ is equal to LAC_s.
  - MNC_O_s is equal to MNC_s.
  - MCC_O_s is equal to MCC_s.
  - If $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ is equal to MAP-TMSI received, $ASSIGN\_RAC_{s\text{-}p}$ is equal to RAC_s.
- If the MC_MAP_ADDR_TYPE is equal to '0001', the mobile station shall declare an address match if all of the following conditions are met:
  - The bits of $MAP\text{-}TMSI_{s\text{-}p}$ are not all equal to '1'.
  - $MAP\text{-}TMSI_{s\text{-}p}$ is equal to MAP-TMSI received in MC_MAP_ADDR_TYPE specific subfield.
  - $ASSIGN\_LAC_{s\text{-}p}$ is equal to LAC received in the specific subfield.
  - MNC_O_s is equal to MNC received in the specific subfield.
  - MCC_O_s is equal to MCC received in the specific subfield.
- If the MC_MAP_ADDR_TYPE is equal to '0010', the mobile station shall declare an address match if all of the following conditions are met:
  - The bits of $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ are not all equal to '1'.
  - $MAP\text{-}P\text{-}TMSI_{s\text{-}p}$ is equal to MAP-TMSI received in MC_MAP_ADDR_TYPE specific subfield.
  - $ASSIGN\_LAC_{s\text{-}p}$ is equal to LAC received in the specific subfield.
  - $ASSIGN\_RAC_{s\text{-}p}$ is equal to RAC received in the specific subfield.
  - MNC_O_s is equal to MNC received in the specific subfield.
  - MCC_O_s is equal to MCC received in the specific subfield.
- If the MC_MAP_ADDR_TYPE is equal to '0011', the mobile station shall declare an address match if the addressed IMEI is the mobile station IMEI.

5.1.5 Changes to Section 2.2.1.2 of C. S0004-A

The following entry is added to Table 2.2.1.2.1.2-1:

Message Name	MSG_TAG	MSG_TYPE (binary)
MC-MAP Initial L3 Message	MAPIL3M	00011011
MC-MAP L3 Message	MAPL3M	000111000
R-TMSI Assignment Completion Message	RTACM	00011101

5.1.6 Changes to Section 3.1.2.2.1.1.1.2 of 3GPP2 C.S0004-A (Requirements for Setting Page Class Fields

The following entries are added to Table 3.1.2.2.1.1.1.2-1:

Description	PAGE_CLASS (binary)	PAGE-_SUBCLASS (binary)	PAGE-_SUBCLASS-_EXT (binary)	Page Record Format Number
Class 3a, R-TMSI with 32-bit R_TMSI_CODE_ADDR (R_TMSI_ZONE not included)	11	01	00	13
Class 3a, with 24-bit R_TMSI_CODE_ADDR (R_TMSI_ZONE not included)	11	01	01	14
Class 3a, with 16-bit R_TMSI_CODE_ADDR (R_TMSI_ZONE not included)	11	01	10	15
Class 3a, with 32-bit R_TMSI_CODE_ADDR (R_TMSI_ZONE included)	11	01	11	16
Class 4a, MAP-TMSI	11	10	00	17
Class 4a, MAP-TMSI with LAI	11	10	01	18
Class 4a, MAP-TMSI with RAI	11	10	10	19

In addition to the procedures described in 3.1.2.2.1.1.1.2 of 3GPP2 C.S0004-A, the base station shall use the following procedure to select the class of page record addressed to MC-MAP mobile station:

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '01' and PAGE_SUBCLASS_EXT equal to '00' if the mobile station has been assigned a R-TMSI within the same R-TMSI zone as the base station.
- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '01' and PAGE_SUBCLASS_EXT equal to '01' if both of the following conditions are met:
  - The mobile station has been assigned a R-TMSI within the same R_TMSI zone as the base station, and

– The most significant octet of R_TMSI_CODE is equal to '00000000'.

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '01' and PAGE_SUBCLASS_EXT equal to '10' if both of the following conditions are met:

  – The mobile station has been assigned a R-TMSI within the same R_TMSI zone as the base station, and

  – The two most significant octets of R_TMSI_CODE are both equal to '00000000'.

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '01' and PAGE_SUBCLASS_EXT equal to '11' if the mobile station has been assigned a R-TMSI in a different R_TMSI zone than is being sent by the base station in Extended Systems Parameter Message or MC-RR Message.

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '10' and PAGE_SUBCLASS_EXT equal to '00' if the mobile station has been assigned a MAP-TMSI within the same LAI (see 4.1 of 3GPP TS 23.003) as the base station.

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '10' and PAGE_SUBCLASS_EXT equal to '01' if the mobile station has been assigned a MAP-TMSI in a different LAI (see 4.1 of 3GPP TS 23.003) as the base station.

- The base station may page the mobile station using a page record with PAGE_CLASS equal to '11', PAGE_SUBCLASS equal to '10' and PAGE_SUBCLASS_EXT equal to '10' if the mobile station has been assigned a MAP-P-TMSI in a different RAI (see 4.2 of 3GPP TS 23.003) as the base station.

5.1.7 Changes to Section 3.1.2.2.1.1.2 of 3GPP2 C.S0004-A

The following additional Page Type-specific Fields are defined:

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '01', and if PAGE_SUBCLASS_EXT = '00', (page record format is equal to 13), the page type-specific fields have the following format:

Field	Length (bits)
R_TMSI_CODE_ADDR	32

R_TMSI_CODE_ADDR Radio temporary mobile station identity code address.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '01', and if PAGE_SUBCLASS_EXT = '01', (page record format is equal to 14), the page type-specific fields have the following format:

Field	Length (bits)
R_TMSI_CODE_ADDR	24

R_TMSI_CODE_ADDR Radio temporary mobile station identity code address.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '01', and if PAGE_SUBCLASS_EXT = '10', (page record format is equal to 15), the page type-specific fields have the following format:

Field	Length (bits)
R_TMSI_CODE_ADDR	16

R_TMSI_CODE_ADDR Radio temporary mobile station identity code address.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '01', and if PAGE_SUBCLASS_EXT = '11', (page record format is equal to 16), the page type-specific fields have the following format:

Field	Length (bits)
R_TMSI_ZONE_LEN	4
R_TMSI_ZONE	8 × TMSI_ZONE_LEN
R_TMSI_CODE_ADDR	32

R_TMSI_ZONE_LEN R-TMSI zone length.

R_TMSI_ZONE R-TMSI zone.

R_TMSI_CODE_ADDR Radio temporary mobile station identity code address.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '10', and if PAGE_SUBCLASS_EXT = '00', (page record format is equal to 17), the page type-specific fields have the following format:

Field	Length (bits)
MAP_TMSI	32

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '10', and if PAGE_SUBCLASS_EXT = '01', (page record format is equal to 18), the page type-specific fields have the following format:

Field	Length (bits)
MCC	10
MNC	10
LAC	16
MAP_TMSI	32

MCC Mobile Country Code (see 2.3.1 of 3GPP2 C.S0005-A).

MNC Mobile Network Code (see 2.3.1.4 of 3GPP2 C.S0005-A).

LAC Location Area Code.

The LAC is coded as a binary number as described in 4.1 of 3GPP TS 23.003.

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

If PAGE_CLASS is equal to '11', and if PAGE_SUBCLASS is equal to '10', and if PAGE_SUBCLASS_EXT = '10', (page record format is equal to 19), the page type-specific fields have the following format:

Field	Length (bits)
MCC	10
MNC	10
LAC	16
RAC	8
MAP_TMSI	32

MCC Mobile Country Code (see 2.3.1 of 3GPP2 C.S0005-A).

MNC Mobile Network Code (see 2.3.1.4 of 3GPP2 C.S0005-A).

LAC Location Area Code.

The LAC is coded as a binary number as described in 4.1 of 3GPP TS 23.003.

RAC Routing Area Code.

The RAC is coded as a binary number as described in 4.2 of 3GPP TS 23.003.

MAP_TMSI TMSI for MAP networks.

The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

5.1.8 Changes to Section 3.1.2.2.1.2 of 3GPP2 C.S0004-A

5.1.8.1 Changes to Section 3.1.2.2.1.2.1 of 3GPP2 C.S0004-A (Definition of Addressing Fields)

Table 3.1.2.2.1.2.1-1 is modified as follows:

Table 3.1.2.2.1.2.1-1. Address Types

Description	ADDR_TYPE (binary)	ADDR_LEN (octets)
IMSI_S	000	5
ESN	001	4
IMSI	010	5 to 7
TMSI	011	2 to 12
Reserved	100	-
BROADCAST	101	Variable
~~Reserved~~R-TMSI	110	2 to 12
~~Reserved~~MC-MAP Address	111	5 to 10

The ADDRESS field for ADDR_TYPE equal to '110' and '111' are defined as follows:

If ADDR_TYPE is equal to '110', the ADDRESS field consists of the following subfields:

Subfield	Length (bits)
R_TMSI_ZONE	If ADDR_LEN is greater than four, 8 × (ADDR_LEN - 4); otherwise, 0.
R_TMSI_CODE_ADDR	If ADDR_LEN is greater than four, 32; otherwise, 8 × ADDR_LEN.

If ADDR_TYPE is equal to '111', the ADDRESS field consists of the following subfields:

Subfield	Length (bits)
MC_MAP_ADDR_TYPE	4
MC-MAP-ADDR_TYPE-specific subfields	4 + 8 × (ADDR_LEN - 1)

For ADDR_TYPE '111', additional addressing parameters are represented in Table 3.1.2.2.1.2.1-4.

Table 3.1.2.2.1.2.1-4. MC_MAP_ADDR_TYPE Address Types

Description	MC_MAP_-ADDR_TYPE (binary)	Length of MC_MAP_-ADDR_TYPE -specific Subfields (bits)
MAP-TMSI	0000	36
MAP-TMSI with LAI	0001	68
MAP-TMSI with RAI	~~0001~~0010	76
IMEI	~~0010~~0011	64
All other MC_MAP_ADDR_TYPE values are reserved		

If MC_MAP_ADDR_TYPE is equal to '0000', then MAP-TMSI type-specific subfields consist of:

Subfield	Length (bits)
RESERVED	4
MAP_TMSI	32

If MC_MAP_ADDR_TYPE is equal to '0001', then MAP-TMSI with LAI type-specific subfields consist of:

Subfield	Length (bits)
MCC	10
MNC	10
LAC	16
MAP_TMSI	32

If MC_MAP_ADDR_TYPE is equal to '~~0001~~0010', then MAP-TMSI with RAI type-specific subfields consist of:

Subfield	Length (bits)
MCC	10
MNC	10
LAC	16
RAC	8
MAP_TMSI	32

If MC_MAP_ADDR_TYPE is equal to '~~0010~~0011', then MAP-TMSI type-specific subfields consist of:

Subfield	Length (bits)
RESERVED	4
IMEI	60

MCC Mobile Country Code (see 2.3.1 of 3GPP2 C.S0005-A).

MNC Mobile Network Code (see 2.3.1.4 of 3GPP2 C.S0005-A).

LAC Location Area Code. The LAC is coded as a binary number as described in 4.1 of 3GPP TS 23.003.

RAC Routing Area Code. The RAC is coded as a binary number as described in 4.2 of 3GPP TS 23.003.

MAP_TMSI TMSI for MAP networks. The TMSI is coded as a binary number as described in 2.4 of 3GPP TS 23.003.

IMEI International Mobile Equipment Identity. The IMEI is coded as a sequence of 15 BCD digits as described in 6.2.1 of 3GPP TS 23.003.

The MCC, MNC, and LAC comprise the Location Area Identity (LAI). See 4.1 of 3GPP TS 23.003); the MCC, MNC, LAC, and RAC comprise the Routing Area Identity (RAI).

5.1.8.2 Changes to Section 3.1.2.2.1.2.2 of 3GPP2 C.S0004-A (Requirements for Setting Addressing Fields)

The base station shall adhere to following additional requirements:

If the base station addresses a mobile station by R-TMSI, the base station shall set ADDR_TYPE to '101', and shall set the ADDRESS field as follows:

- If the base station includes the R_TMSI_ZONE in the ADDRESS field, the base station shall set the R_TMSI_ZONE field to the R-TMSI zone number associated with the assigned R-TMSI as specified in TIA/EIA/IS-735, and shall set the ADDR_LEN field to 4 + the length of the R-TMSI zone number in octets. The base station shall also include the R_TMSI_CODE_ADDR in the ADDRESS field, set to the 32-bit R-TMSI code assigned to the mobile station.
- If the base station does not include the R_TMSI_ZONE in the ADDRESS field, the base station shall include only the R_TMSI_CODE_ADDR in the ADDRESS field and shall set this field as follows:
  - If the most significant octet of the R_TMSI_CODE assigned to the mobile station is equal to '00000000', the base station may set R_TMSI_CODE_ADDR to the 24 least significant bits of the R_TMSI_CODE assigned to the mobile station and set ADDR_LEN to 3.
  - If the two most significant octets of the R_TMSI_CODE assigned to the mobile station are both equal to '00000000', the base station may set R_TMSI_CODE_ADDR to the 16 least significant bits of the R_TMSI_CODE assigned to the mobile station and set ADDR_LEN to 2.
  - Otherwise, the base station shall set R_TMSI_CODE_ADDR to the R_TMSI_CODE assigned to the mobile station and set ADDR_LEN to 4.

If the base station addresses a mobile station by MAP-TMSI, the base station shall set ADDR_TYPE to '111', and shall set the ADDRESS field as follows:

- If the base station does not include the MAP-TMSI LAI or RAI in the ADDRESS field, the base station shall set MC_MAP_ADDR_TYPE field to '0000', the RESERVED subfield to '0000' , MAP-TMSI subfield to MAP-TMSI or MAP-P-TMSI assigned to mobile station and set ADDR_LEN to 5.
- If the base station includes the MAP-TMSI LAI in the ADDRESS field, the base station shall set MC_MAP_ADDR_TYPE field to '0001', ADDR_LEN to 9 and shall set the MCC, MNC, LAC and MAP-TMSI fields to the respective values assigned to mobile station.
- If the base station includes the MAP-TMSI RAI in the ADDRESS field, the base station shall set MC_MAP_ADDR_TYPE field to '0010', ADDR_LEN to 10 and shall set the MCC, MNC, LAC, RAC and MAP-TMSI fields to the respective values assigned to mobile station.

If the base station addresses a mobile station by IMEI, the base station shall set ADDR_TYPE to '111' and MC_MAP_ADDR_TYPE to '0011'. It shall set the RESERVED subfield to '0000', set the IMEI number of the mobile station in the subfield, and shall set ADDR_LEN to8.

5.1.9 Changes to Section 3.1.2.3 of 3GPP2 C.S0004-A

The following entries are added to Table 3.1.2.3.1.1.2-1:

Message Name	MSG_TAG	MSG_TYPE (binary)	Logical Channel
MC-MAP Sync Channel Message	MAPSCHM	00100010	sync
MC-MAP System Information Message	MAPSIM	00100011	broadcast
MC-MAP L3 Message	MAPL3M	00100100	general signaling
R-TMSI Assignment Message	RTASM	00100101	general signaling

5.1.10 Changes to Section 3.2.2.2 of 3GPP2 C.S0004-A

The following entry is added to Table 3.2.2.2.1.2-1:

Message Name	MSG_TAG (binary)	MSG_TYPE
MC-MAP L3 Message	MAPL3M	00101001
MC-MAP GSM Handover Command Message	MAPGHCM	00101010
MC-MAP Dedicated Mode Paging Message	MAPDMPM	00101011
R-TMSI Assignment Message	RTASM	00101100

5.2 Enhanced Services

The enhanced services provided by the MC-MAP LAC sublayer are described in 5.2.1. The modifications to 3GPP2 C.S0004-A required to provide the Enhanced Services are described in 5.2.2.

5.2.1 Description of Enhanced Services

Enhanced services are defined only for MM and CM messages over dedicated channels and are applied only to those messages requiring such services.

1. Priority: Layer 2 transmits Layer 3 messages while maintaining priorities. The RR sub-layer specifies the priority level to be used for a specific Layer 3 message to be transmitted.
2. Service Access Point multiplexing: Layer 2 supports the transmission and reception of Layer 3 messages related to several Service Access Point Identifiers (SAPIs).
3. Outgoing message queues flushing: This procedure is used in a network entity to flush (i.e., complete transmitting) outgoing Layer 3 messages queued by Layer 2. The purpose of the outgoing message queues flushing service is to provide a mechanism for reliably avoiding Layer 3 message loss (in the network) during hard handoff.
4. Suspension/Resumption (handoff): The purpose of the suspension and resumption services is to provide a mechanism for reliably avoiding MM and CM message loss during a change of dedicated channels. Change of dedicated channels, which is hard handoff, includes both intra-system hard handoff (e.g., CDMA-to-CDMA), and inter-system hard handoff (e.g., CDMA-to-GSM).
5. Enhanced Services Sublayer In-order delivery: Specific received Layer 3 messages are passed to the RR according to the order they were transmitted by the Layer 3 peer entity.

5.2.2 Modifications to 3GPP2 C.S0004-A for Enhanced Services

5.2.2.1 Enhanced Services Sublayer on the r-dsch for the Mobile Station

5.2.2.1.1 Parameters

The mobile station shall use the fields defined in 5.2.2.1.1.1 for PDUs transmitted on the r-dsch and shall set these fields according to the requirements in 5.2.2.1.1.2

5.2.2.1.1.1 Definition of Enhanced Services Parameters

The Enhanced Services parameters have the following format:

Field	Length (bits)
SAPI	2
ORD_IND	1
L3_MSG_NUM	0 or 2

SAPI — Service access point identifier.

This field indicates the service access point at the peer where this PDU is to be delivered.

ORD_IND — Ordering indicator.

This field indicates whether ordering shall be applied to SDU carried

		by this PDU.
	L3_MSG_NUM	Layer 3 message number.
		If ORD_IND is '1', this field is the ordinal number (modulo 4) of the SDU carried by this PDU. If ORD_IND is '0', this field is omitted.

5.2.2.1.1.2 Requirements for Setting the Enhanced Services Parameters

The mobile station shall set the SAPI field to the SAPI value associated with the SDU contained in this PDU, as shown in Table 5.2.2.1.1.2-1.

Table 5.2.2.1.1.2-1. Allocation of SAPI values

SAPI value	Related entity
0	CM, MM, and RR signaling
3	Short message service (SMS)
All others	Reserved

The mobile station shall set the ORD_IND field to '1' if ordering is to be applied to this PDU by the base station; otherwise, the mobile station shall set ORD_IND to '0'. If ORD_IND is set to '1', mobile station shall set ACK_REQ field (see 2.2.1.1 of 3GPP2 C.S0004-A) to '1'.

If ORD_IND is set to '1', the mobile station shall include the L3_MSG_NUM field and set it to 0 for the first message requiring ordering and to one more (modulo 4) than the last value used for all subsequent messages requiring ordering.

5.2.2.1.2 Procedures

The mobile station shall maintain a transmission queue for each priority level (i.e., high, medium, and low). The mobile station shall add each message to the transmission queue associated with the priority of the message. For a given priority, the mobile station shall add messages to the appropriate queue in the order that they are received from the Upper Layers, irrespective of the service access point at which each message is received.

The mobile station shall transmit messages in order of priorities, i.e., all messages in the high priority transmission queue, followed by all messages in the medium priority transmission queue, and finally all messages in the low priority transmission queue.

When an indication is received to flush outgoing message queues, the mobile station shall flush all transmission queues maintained at the Enhanced Services Sublayer.

5.2.2.2 Changes to Section 2.2.1.2.2 of 3GPP2 C.S0004-A (Procedures for the Utility Sublayer)

If P_REV_IN_USE$_s$ is greater than or equal to seven, the mobile station shall assemble regular PDUs for the r-dsch using the following format:

Parameter	Reference
Message Type Field	2.2.1.2.1.1 of 3GPP2 C.S0004-A
ARQ Fields	2.2.1.1.1.1 of 3GPP2 C.S0004-A
Enhanced Services Fields	5.2.2.1.1.1 of this document
Extended-Encryption Field	2.2.1.4.1.5 of 3GPP2 C.S0004-A
SDU	3GPP2 C.S0005-A
PDU Padding Field	2.2.1.2.1.1 of 3GPP2 C.S0004-A

5.2.2.3 Enhanced Services Sublayer on the f-dsch for the Mobile Station

5.2.2.3.1 Parameters

The mobile station shall use the Enhanced Services fields defined in 5.2.2.1.1 for PDUs received on the f-dsch.

5.2.2.3.2 Procedures

For messages requiring ordering (PDUs with the ORD_IND set to '1'), the Enhanced Services Sublayer shall deliver the SDU carried by the PDU to the Upper Layers in the order determined by the SAPI and L3-MSG_NUM (modulo 4) fields of the received PDU. The Enhanced Services Sublayer shall buffer each SDU that can not be delivered to the Upper Layers immediately upon reception, until all SDUs prior to it have been delivered to the Upper Layers.

The mobile station shall deliver each SDU (subject to ordering, if needed) to Layer 3 at the service access point identified by the SAPI field of the received PDU.

5.2.2.4 Enhanced Services Sublayer on the r-dsch for the Base Station

The base station shall use the Enhanced Services parameters defined in 5.2.2.1.1 and the Enhanced Services procedures defined in 5.2.2.1.2.

5.2.2.5 Changes to Section 3.2.2.2.2 of 3GPP2 C.S0004-A (Procedures for the Utility Sublayer)

If P_REV_IN_USE is greater than or equal to seven, the base station shall use the following format to assemble regular PDUs for transmission on the f-dsch:

Field	Reference
MSG_TYPE	Section 3.2.2.2.1.1
ARQ Fields	Section 3.2.2.1.1.1
Enhanced Services Fields	Section 5.2.2.1.1.1 of this document
Extended-Encryption Fields	Section 3.2.2.2.1.1
SDU	TIA/EIA/IS-2000-5
PDU_PADDING	Section 3.2.2.2.1.1

5.2.2.6 Enhanced Services Sublayer on the r-dsch for the Base Station

The base station shall use the Enhanced Services parameters defined in 5.2.2.3.1 and the Enhanced Services procedures defined in 5.2.2.3.2.

6 Modifications to C.S0005-A, *Upper Layer (Layer 3) Signaling Standard for cdma2000 Standards for Spread Spectrum Systems*

The 3GPP2 C.S0005-A standard contains RRC, MM, and CM procedures for operation with TIA/EIA-41 networks. This section provides modifications to 3GPP2 C.S0005-A to support MC-MAP operation. These modifications include indicating which messages, procedures, and sections of 3GPP2 C.S0005-A are applicable to MC-MAP operation. The result is isolation of the RRC layer of cdma2000.

Several enhancements are required to the isolated RRC layer to support MC-MAP operation: The *MC-MAP Sync Channel Message* is added to provide indication of the frequency to use when acquiring the MC-MAP system and to convey MAP identities. The *MC-MAP System Information Message* is added to encapsulate non-access stratum system information. The *MC-MAP RRC Connection Request Message* is added to request the MC RRC equivalent of an RRC connection. The *MC-MAP Initial L3 Message* and the *MC-MAP L3 Message* are added to encapsulate Direct Transfer information. Several existing cdma2000 RRC messages are modified for MC-MAP operation. Updates to procedures are given to use the new messages and the modified existing cdma2000 messages. Many of the procedures are shown in a method similar to that used in 3GPP documents. The result is an RRC layer that can support MAP services and can provide handovers to GSM systems.

Common channel operation can be on either the TIA/EIA-95-B common channels (Paging Channel and Access Channel) or the new cdma2000 common channels (Broadcast Channel, Forward Common Control Channel, Enhanced Access Channel, and Reverse Common Control Channel). The MC-MAP mobile station can be assigned from either set of common channels to any of the Spreading Rate 1 or Spreading Rate 3 radio configurations. If appropriately provisioned, either a TIA/EIA-95-B base station or a cdma2000 base station can support mobile station supporting the TIA/EIA-41 protocols, the MAP protocols, or both.

In this section, the term "Higher Layer" or "Upper Layer" refers to the 3GPP MM and CM layers. Furthermore, a “Service Option Connection” instance shall be interpreted as a radio bearer (RB) instance, rather than a service instance; the associated “Connection Reference” parameter shall be interpreted as “radio bearer identifier”.

6.1 RRC Services Provided to Upper Layers

The MC-MAP RRC sublayer offers the following services to upper GSM layers:

- General Control
- Notification
- Dedicated control.

6.2 Functions of MC-MAP RRC

The MC-MAP RRC sublayer performs the following main functions:

- Broadcast of information provided by the GSM-MAP core network.
- Broadcast of information related to the CDMA MC radio access network.
- Establishment, maintenance and release of an RRC connection between the mobile station and the CDMA MC radio access network.
- Establishment, reconfiguration and release of Radio Access Bearers.
- Assignment, reconfiguration and release of radio resources for the RRC connection.
- RRC connection mobility functions.
- Routing of Upper Layer PDUs.
- Control of requested QoS.
- MS measurement reporting and control of the reporting.

- Control of ciphering.
- Paging/notification.
- Initial cell selection and re-selection in idle mode.
- RRC message integrity protection.

6.3 MC-MAP RRC Procedures

6.3.1 Modifications to 3GPP2 C.S0005-A Procedures

The MC-MAP RRC processing is driven by the upper GSM RIL3-MM and RIL3-CM sublayers.

6.3.1.1 Modifications to 3GPP2 C.S0005-A Mobile Station Procedures

The MC-MAP mobile station RRC processing consists of the following states as defined in 2.6 of 3GPP2 C.S0005-A.

- *Mobile Station Initialization State* - In this state, the mobile station selects and acquires a system. See 6.3.1.1.1.
- *Mobile Station Idle State* - In this state, the mobile station monitors messages on the f-csch. See 6.3.1.1.2.
- *System Access State* - In this state, the mobile station sends messages to the base station on the r-csch. See 6.3.1.1.3.
- *Mobile Station Control on the Traffic Channel State* - In this state, the mobile station communicates with the base station using the f-dsch and r-dsch. See 6.3.1.1.4.

6.3.1.1.1 Mobile Station Initialization State

In the *Mobile Station Initialization State* the MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.1 of 3GPP2 C.S0005-A with the following modifications:
The MC-MAP mobile station does not maintain registration timers. The registration process (location update) is the responsibility of the upper GSM RIL3-MM sublayer.
The MC-MAP mobile stations need not support Analog mode operation.

6.3.1.1.1.1 System Determination Substate

In MC-MAP, the process of system determination is driven by the upper GSM RIL3-MM sublayer, which is responsible for network selection (PLNM selection).
The MC-MAP mobile station shall perform the system determination process as follows:

- The mobile station shall determine which system/network to use.
- The mobile station shall determine the band class (see C.R1001) for the selected system/network.
- The mobile station shall tune to the CDMA Channel number for the selected system/network.

The precise process of system determination is left to the mobile station manufacturer. It is typically influenced by a set of expressed user preferences.

6.3.1.1.1.2 Pilot Channel Acquisition Substate

In the *Pilot Channel Acquisition Substate* the MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.1.2 of 3GPP2 C.S0005-A.

6.3.1.1.1.3 Sync Channel Acquisition Substate

In the *Sync Channel Acquisition Substate* the MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.1.3 of 3GPP2 C.S0005-A with the following modifications:

In addition to the *Sync Channel Message* the MC-MAP mobile station shall receive and process the *MC-MAP Sync Channel Message* (as described in 6.4.1.1.1) to obtain system configuration and optionally timing information. The SID and NID parameters of the *Sync Channel Message* shall be ignored.The network identification is taken from the *MC-MAP Sync Channel Message.* The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of $REDIRECTION_s$ and $NDSS\_ORIG_s$ variables.

6.3.1.1.1.4 Timing Change Substate

In the *Timing Change Substate*, the MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.1.4 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall set the stored message sequence numbers variables for the following MC-MAP specific messages to NULL:

- *MC-MAP System Information Message* ($MAP\_SYS\_PAR\_MSG\_SEQ_s$),

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of $TMSI_{s-p}$ variable.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to registration.

6.3.1.1.2 Mobile Station Idle State

In the *Mobile Station Idle State*, the MC-MAP mobile station monitors the f-csch. The MC-MAP mobile station can receive broadcast messages, receive messages individually addressed to the mobile station, initiate an RR-level registration or initiate establishment of an RRC connection to the base station. The MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.2 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of $REDIRECTION_s$ and $NDSS\_ORIG_s$ variables.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to PACA operation.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to registration. Instead the MC-MAP mobile station shall perform RR-level registration procedures as specified in 6.3.1.2.4.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of Roaming Status.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of $AUTH_r$, $AUTH_s$ and $RAND_s$, $RAND_r$ variables.

The MC-MAP mobile station shall perform RRC connection establishment procedures as specified in section 6.3.2.1.1.

If requested by the Upper Layers, the MC-MAP mobile station RRC may perform direct transfer operation as specified in section 6.3.2.3.

The MC-MAP mobile station shall process MS Capability enquiry as specified in 6.3.2.2.

The MC-MAP mobile station shall perform Security Mode Control procedures as specified in 6.3.2.5.

6.3.1.1.2.1 Paging Channel and Forward Common Control Channel Monitoring Procedures

The MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.2.1.1 of 3GPP2 C.S0005-A with the following modification: The MC-MAP mobile station shall not take into account user preference ($SLOT\_CYCLE\_INDEX_p$) for the calculation of the Paging Channel and QPCH slot cycle index if it does not have a valid R-TMSI assigned.

6.3.1.1.2.2 Response to Overhead Information Operation

The Response to Overhead Information Operation is performed whenever the mobile station receives an overhead message. The MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.2.2 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall receive and process the following f-csch messages (see Table 6.4-3):

The overhead messages received on the Broadcast Channel are:

- *MC-MAP System Information Message*
- *MC-RR Parameters Message*
- *Enhanced Access Parameters Message*
- *Universal Neighbor List Message*
- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*

The overhead messages received on the Paging Channel are:

- *MC-MAP System Information Message*
- *Access Parameters Message*
- *System Parameters Message*
- *Neighbor List Message*
- *CDMA Channel List Message*
- *Extended System Parameters Message*
- *Extended Neighbor List Message*
- *General Neighbor List Message*
- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*

The MC-MAP mobile station shall ignore all other overhead messages received in the f-csch.

The MC-MAP mobile station shall store the configuration message sequence number contained in MC-MAP *MAP System Information Message* ($MAP\_SYS\_PAR\_MSG\_SEQ_S$). The MC-MAP mobile station shall consider the stored configuration parameters to be current if all configuration message sequence numbers including $MAP\_SYS\_PAR\_MSG\_SEQ_S$ are equal to $CONFIG\_MSG\_SEQ_S$ in addition to the other requirements specified in C.S005-A section 2.6.2.2.

Processing of Non-Access Stratum Information included in the *MC-MAP System Information Message* (CN_INFO_FIELDS) shall be according to the corresponding requirements defined for these parameters in the Non-Access Stratum protocols.

The MC-MAP mobile station shall ignore the parameters DELETE_FOR_TMSI, USE_TMSI, PREF_MSID_TYPE, TMSI_ZONE_LEN and TMSI_ZONE received *on Systems Parameter Message* and *MC-RR Parameters Message.*

The MC-MAP mobile station shall store the following additional parameters received in the *MC-RR Parameters Message*:

- Delete foreign R-TMSI ($DELETE\_FOR\_R\_TMSI_S = DELETE\_FOR\_R\_TMSI_r$)
- R_TMSI used indicator ($R\_TMSI\_USED_S = R\_TMSI\_USED_r$)
- R-TMSI zone length ($R\_TMSI\_ZONE\_LEN_S = R\_TMSI\_ZONE\_LEN_r$)
- R-TMSI zone number ($R\_TMSI\_ZONE_S = R\_TMSI\_ZONE_r$)

- The mobile station shall set all bits of $R\_TMSI\_CODE_S$ to '1' if all of the following conditions are met:
  - The bits of $R\_TMSI\_CODE_S$ are not all equal to '1',
  - $DELETE\_FOR\_R\_TMSI_S$ is equal to '1', and
  - $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ is not equal to $R\_TMSI\_ZONE\_LEN_S$, or the least significant $ASSIGNING\_R\_TMSI\_ZONE\_LEN_S$ octets of $ASSIGNING\_R\_TMSI\_ZONE_S$ are not equal to $R\_TMSI\_ZONE_S$.

6.3.1.1.2.3 Mobile Station Order and Message Processing Operation

The mobile station Order and Message Processing Operation is performed whenever the mobile station receives messages other than overhead and page messages. The MC-MAP mobile station shall comply with the Layer 3 processing requirements specified in 2.6.2.4 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore all messages and orders received except for the *Data Burst Message, Status Request Message, Service Redirection Message, Global Service Redirection Message, Extended Channel Assignment Message, Extended Global Service Redirection Message, Security Mode Command Message,* and *R-TMSI Assignment Message*. *R-TMSI Assignment Message* is received in response to the mobile station RR-level Registration Message.

The mobile station shall process the R-TMSI Assignment Message as discussed in 6.3.4.

The MC-MAP mobile station shall then respond with a *R-TMSI Assignment Completion Message* within T_{56m} seconds.

6.3.1.1.3 RR-level Registration Procedures

Upon power on, the MC-MAP mobile station shall set all the bits of $R\_TMSI\_CODE_S$ to '1'.

While in the *Mobile Station Idle State,* the MC-MAP mobile station shall perform the registration procedures specified in 6.3.4.

6.3.1.1.4 System Access State

In the *System Access State*, the MC-MAP mobile station sends messages to the base station on the r-csch. The MC-MAP mobile station shall comply with the layer 3 processing requirements specified in 2.6.3 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to handling of $REDIRECTION_s$ and $NDSS\_ORIG_s$ variables.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to PACA operation.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to registration.

The MC-MAP mobile station shall ignore the Layer 3 processing requirements related to authentication.

Only the following substates of the *System Access State* are applicable to the MC-MAP mobile station:

- *Update Overhead Information Substate* – In this substate, the mobile station monitors the f-csch until it has received a current set of overhead messages.
- *Mobile Station Origination Attempt Substate* - In this substate, the mobile station sends an *MC-MAP RRC Connection Request Message* to the base station, in response to a request from the Upper Layers to establish an RRC connection.
- *Mobile Station Message Transmission Substate* - In this substate, the mobile station sends a *Initial MC-MAP L3 Message*, a *MC-MAP L3 Message* or a *Data Burst Message* to the base station.

- *Page Response Substate* - In this substate, the mobile station sends a *MC-MAP RRC Connection Request Message* to the base station, in response to receiving a *General Page Message* from the base station.
- *Mobile Station Order/Message Response Substate* – In this substate, the mobile station sends a message or an order to the base station, in response to receiving a message or an order from the base station.
- *RR-level Registration Access Substate* – In this substate, the mobile station sends an *RR-level Registration Message* to the base station.

6.3.1.1.4.1 Access Procedures

The MC-MAP mobile station shall comply with the requirements specified in 2.6.3.1 of 3GPP2 C.S0005-A.

6.3.1.1.4.2 Update Overhead Information Substate

In the *Update Overhead Information Substate*, the MC-MAP mobile station monitors f-csch channels until it has received the current configuration messages. The MC-MAP mobile station shall comply with the layer 3 processing requirements specified in 2.6.3.2 of 3GPP2 C.S0005-A with the following additional modifications:. The MC-MAP mobile station shall receive and process the following f-csch overhead messages (see Table 6.4-3):

The overhead messages received on the Broadcast Channel are:

- *MC-MAP System Information Message*
- *MC-RR Parameters Message*
- *Enhanced Access Parameters Message*
- *Universal Neighbor List Message*
- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*

The overhead messages received on the Paging Channel are:

- *Access Parameters Message*
- *System Parameters Message*
- *Neighbor List Message*
- *CDMA Channel List Message*
- *Extended System Parameters Message*
- *Extended Neighbor List Message*
- *General Neighbor List Message*
- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*

The MC-MAP mobile station shall ignore all other overhead messages received in the f-csch.

6.3.1.1.4.3 Page Response Substate

The MC-MAP mobile station enters this substate to send an *MC-MAP RRC Connection Request Message* or an *RR-level Registration Message* to the base station, in response to receiving a *General Page Message* from the base station:

- If the MC-MAP mobile station is not registered at RR level, (i.e., all the bits of $R\_TMSI\_CODE_S$ are equal to '1'), the MC-MAP mobile station shall send an *MC-MAP RRC Connection Request Message* requiring an RRC connection establishment.
- If the mobile station has a valid R-TMSI assigned, it shall send an *RR-level Registration Message* with RR_REG_TYPE value indicating "Page Response".

The MC-MAP mobile station shall comply with all the requirements specified in 2.6.3.3 of 3GPP2 C.S0005-A with the following additional modification:

The MC-MAP mobile station sends an *MC-MAP RRC Connection Request Message* or an *RR-level Registration Message*, instead of a *Page Response Message*, to the base station.

6.3.1.1.4.4 Mobile Station Order/Message Response Substate

In this substate, the mobile station sends a message or an order to the base station, in response to receiving a message or an order from the base station. The MC-MAP mobile station shall comply with all the requirements specified in 2.6.3.4 of 3GPP2 C.S0005-A, except for the modifications identified above for the *System Access State*.

6.3.1.1.4.5 Mobile Station Origination Attempt Substate

The MC-MAP mobile station enters this substate to send an *MC-MAP RRC Connection Request Message* to the base station, in response to a request by the Upper Layers of the mobile station to establish an RRC connection.

The MC-MAP mobile station shall comply with all the requirements specified in 2.6.3.5 of 3GPP2 C.S0005-A with the following additional modifications:

The MC-MAP mobile station sends a *MC-MAP RRC Connection Request Message*, instead of an *Origination Message* to the base station.

6.3.1.1.4.6 RR-level Registration Access Substate

The MC-MAP mobile station enters this substate to send an *RR-level Registration Message* instead of a *Registration Message*. While in this substate, the MC-MAP mobile station shall comply with the requirements in 2.6.3.6 of 3GPP2 C.S0005-A and additional requirements specified in 6.3.4.

6.3.1.1.4.7 Mobile Station Message Transmission Substate

The MC-MAP mobile station enters this substate to send a *MC-MAP Initial L3 Message*, a *MC-MAP L3 Message* or a *Data Burst Message* to the base station.

The MC-MAP mobile station shall comply with all the requirements specified in 2.6.3.7 of 3GPP2 C.S0005-A, with the following additional modification: The MC-MAP mobile station shall ignore the requirements for sending a *Flash With Information Message* to the base station.

6.3.1.1.4.8 PACA Cancel Substate

The MC-MAP mobile station shall ignore the requirements in 2.6.3.8 of 3GPP2 C.S0005-A.

6.3.1.1.5 Mobile Station Control on Traffic Channel State

In the *Mobile Station Control on the Traffic Channel State*, the MC-MAP mobile station shall comply with the requirements specified in 2.6.4 of 3GPP2 C.S0005-A with the following modifications:

6.3.1.1.5.1 Service Configuration and Negotiation

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.1.2 of 3GPP2 C.S0005-A with the following modification:The MC-MAP mobile station shall ignore all the procedures, messages, and orders related to service option negotiation.

6.3.1.1.5.2 Ordering of Messages

The MC-MAP mobile station shall ignore the requirements specified in 2.6.4.1.3 of 3GPP2 C.S0005-A. Ordered delivery of Upper Layer PDU shall be requested from the MC-MAP LAC.

6.3.1.1.5.3 Processing the In-Traffic System Parameters Message

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.1.4 of 3GPP2 C.S0005-A with the following modification: The MC-MAP mobile station shall ignore the following fields of the *In-Traffic System Parameters Message*: SID, NID, PACKET_ZONE_ID.

6.3.1.1.5.4 Message Action Times

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.1.5 of 3GPP2 C.S0005-A with the following modification: The MC-MAP mobile station shall ignore the procedures related to service option negotiation orders.

6.3.1.1.5.5 Long Code Transition Request Processing

The MC-MAP mobile station shall ignore the requirements specified in 2.6.4.1.6 of 3GPP2 C.S0005-A.

6.3.1.1.5.6 Processing the Service Configuration Record

The MC-MAP mobile station shall comply with the requirements specified in C.S0005-A section 2.6.4.1.14 with the following modifications:

If a service option connection (i.e., RB instance) identified by CON_REF_DELETED has been omitted from the received service option connection records, the RRC shall release the corresponding radio bearer.

The MC-MAP mobile station shall ignore all the procedures referring to "Call Control instance".

The MC-MAP mobile station shall ignore all the procedures related to the following parameters of the service option connection record: CC_INFO_INCL, RESPONSE_IND, TAG, BYPASS_ALERT_ANSWER.

6.3.1.1.5.7 Traffic Channel Initialization Substate

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.2 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore all the procedures related to the MM functionality (registration initialization, registration timer maintenance, $TMSI\_CODE_{s\text{-}p}$, etc.).

The MC-MAP mobile station shall ignore all the procedures related to "Call Control instance" and TAG_S.

The MC-MAP mobile station shall perform the following additional operations:

- The MC-MAP mobile station perform RR-level registration maintenance procedures as described in 6.3.4.1.2.4.1 and 6.3.4.1.2.4.2.
- The MC-MAP RRC shall inform the Upper Layers that the RRC connection has been established.

6.3.1.1.5.8 Traffic Channel Substate

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.3 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore all the procedures related to "Call Control instance", TAG_S, and communication between Layer 3 and Call Control instances.

The MC-MAP mobile station shall ignore all the procedures for handling a received *Call Assignment Message*; The MC-MAP mobile station shall process a *Call Assignment Message* received from the base station as specified in section 6.3.2.4.

The MC-MAP mobile station shall ignore all the procedures related to the MM functionality (registration timer maintenance, $TMSI\_CODE_{s\text{-}p}$, etc.).

The MC-MAP mobile station shall ignore all the procedures related to service option negotiation orders.

The MC-MAP mobile station shall ignore all the procedures related to emergency calls.

The MC-MAP mobile station shall perform RRC connection release procedures as specified in section 6.3.2.1.2.

If requested by the Upper Layers, the MC-MAP mobile station RRC may perform direct transfer operation as specified in section 6.32.3.

The MC-MAP mobile station shall process dedicated mode paging as specified in section 6.3.2.4.

The MC-MAP mobile station shall perform the establishment, reconfiguration, and release of radio bearers (RB) as specified in section 6.3.2.6.

The MC-MAP mobile station shall process MS Capability enquiry as specified in 6.3.2.2.

The MC-MAP mobile station shall perform Security Mode Control procedures as specified in 6.3.2.5.

The MC-MAP mobile station shall process the following new MC-MAP messages received from the base station as indicated:

- *MC-MAP L3 Message*: The mobile station shall process this message as specified in section 6.3.2.3.2.
- *R-TMSI Assignment Message*: the MC-MAP mobile station shall process this message as specified in 6.3.4. The mobile station shall then respond with a *R-TMSI Assignment Completion Message* within T56m seconds.
- *MC-MAP GSM Handover Command Message*: the MC-MAP mobile station shall process this message as specified in 6.3.3.2.1.1.

Procedures related to receiving the following messages from the BS shall be ignored (see Tables 6.4-4 and 6.4.3-2):

- *Alert With Information Message*
- *Authentication Challenge Message*
- *Base Station Challenge Confirmation Order*
- *Continuous DTMF Tone Order*
- *Flash With Information Message*
- *Maintenance Order*
- *Mobile Station Registered Message*
- *Send Burst DTMF Message*
- *Service Option Control Order*
- *Service Option Request Order*
- *Service Option Response Order*

- *SSD Update Message*
- *TMSI Assignment Message*
- *Extended Alert With Information Message*
- *Extended Flash With Information Message*

6.3.1.1.5.9 Release Substate

The MC-MAP mobile station shall comply with the requirements specified in 2.6.4.4 of 3GPP2 C.S0005-A with the following modifications:

The MC-MAP mobile station shall ignore all the procedures related to "Call Control instance" and communication between Layer 3 and Call Control instances.

The MC-MAP mobile station shall ignore all the procedures related to the MM functionality (registration timer maintenance, $TMSI\_CODE_{s-p}$, etc.).

Procedures related to receiving the following messages from the BS shall be ignored (see Tables 6.4-4 and 6.4.3-2):

- *Alert With Information Message*
- *Mobile Station Registered Message*
- *Service Option Control Message*
- *Service Option Control Order*
- *TMSI Assignment Message*
- *Extended Alert With Information Message*

6.3.1.1.5.10 Call Control Processing

The MC-MAP mobile station shall ignore all the requirements in 2.6.10 of 3GPP2 C.S0005-A.

6.3.1.2 Modifications to 3GPP2 C.S0005-A Base Station Procedures

Base station processing consists of the following types of processing:

- *Pilot and Sync Channel Processing.* See 6.3.1.2.1.
- *Common Channel Processing.* See 6.3.1.2.2.
- *Access Channel and Enhanced Access Channel Processing.* See 6.3.1.2.3.
- *Traffic Channel Processing.* See 6.3.1.2.4.

The MC-MAP base station transmits on Pilot Channel, Sync Channel and Paging Channel or Forward Common Control Channel to broadcast MC-MAP system information to idle and connected mode mobile stations in a cell.

6.3.1.2.1 Pilot and Sync Channel Processing

The MC-MAP base station shall comply with the requirements specified in 3.6.1 of 3GPP2 C.S0005-A with the following modifications(in addition to modifications corresponding to those identified in 6.3.1.1.1):

The MC-MAP base station shall continuously send *MC-MAP Sync Channel Message* on each Sync Channel on which the base station transmits. If the base station transmits both *Sync Channel Message* and *MC-MAP Sync Channel Message*, the base station shall not duplicate the CDMA MC specific parameters in the *MC-MAP Sync Channel Message*.

6.3.1.2.2 Common Channel Processing

The MC-MAP base station shall comply with the requirements specified in 3.6.2 of 3GPP2 C.S0005-A with the following modifications (in addition to modifications corresponding to those identified in 6.3.1.1.2 and 6.3.1.1.3):

The MC-MAP base station shall perform RRC connection establishment procedures as specified in section 6.3.2.1.1.

If requested by the Upper Layers, the MC-MAP base station RRC may perform direct transfer operation as specified in section 6.3.2.3.

The MC-MAP base station shall perform MS Capability enquiry as specified in 6.3.2.2.

The MC-MAP base station shall perform Security Mode Control procedures as specified in 6.3.2.5.

Overhead messages sent by the MC-MAP base station on the Broadcast Channel are:

- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*
- *MC-RR Parameters Message*
- *Universal Neighbor List Message*
- *MC-MAP System Information message*
- *Enhanced Access Parameters Message*

The overhead messages sent by the MC-MAP base station on the Paging Channel are:

- *Access Parameter Message*
- *System Parameter Message*
- *CDMA Channel List Message*
- *Extended System Parameters Message*
- *Neighbor List Message*
- *Extended Neighbor List Message*
- *General Neighbor List Message*
- *User Zone Identification Message*
- *Private Neighbor List Message*
- *Extended CDMA Channel List Message*
- *MC-MAP System Information message*

The requirements related to response to *Registration Message*, *Origination Message*, and *Page Response Message* shall be ignored by the MC-MAP base station.

The MC-MAP base station shall comply with the requirements specified in 3.6.2.1 and 3.6.2.3 of 3GPP2 C.S0005-A for sending *General Page Message* to the MC-MAP mobile stations. The SERVICE_OPTION field

of this message shall be set to one of the MC-MAP service options defined in C.R1001-A (i.e., Speech Call, CS Data Call, PS Data Call, or SMS) that corresponds to the "paging cause" received from the Upper Layers.

6.3.1.2.3 Access Channel Processing

The MC-MAP base station shall comply with the requirements specified in 3.6.3 of 3GPP2 C.S0005-A with the following modifications (in addition to modifications corresponding to those identified in 6.3.1.1.2 and 6.3.1.1.3):

The MC-MAP base station shall perform RRC connection establishment procedures as specified in section 6.3.2.1.1.

If requested by the Upper Layers, the MC-MAP base station RRC may perform direct transfer operation as specified in section 6.3.2.3.

The MC-MAP base station shall perform MS Capability enquiry as specified in 6.3.2.2.

The MC-MAP base station shall perform Security Mode Control procedures as specified in 6.3.2.5.

6.3.1.2.3.1 RR-level Registration

RR-level Registration is the process by which a mobile station registers with the RR-layer of the base station. The mobile station that wants to register with the base station at RR-layer shall send the *RR-level Registration Message* if the R-TMSI is assigned.
The base station shall perform following procedures depending on RR_REG_TYPE field of the *RR-level Registration Message*:

- If RR_REG_TYPE is equal to '0000', indicating periodic timer-based RR-level registration, the MC-MAP base station shall respond with *R-TMSI Assignment Message* to inform the mobile station that it is registered at RR. It may use the message to assign a new R-TMSI or to release the RRC connection on common channels by setting all the bits of R_TMSI_CODE to '1' in *R-TMSI Assignment Message*.

- If RR_REG_TYPE is equal to '0001' indicating zone-based RR-level registration, the MC-MAP base station shall respond with *R-TMSI Assignment Message* with a new R-TMSI to inform the mobile station that it is registered at RR. To release the RRC connection on common channels, the base station shall set all the bits of R_TMSI_CODE to '1'.

- If RR_REG_TYPE is equal to '0010' indicating "Page Response", RRC of the MC-MAP base station shall inform the appropriate Upper Layers of the confirmation of the Paging. If the Upper Layers request the establishment of dedicated traffic channel, the base station may send the *Extended Channel Assignment Message* as described 6.3.2.1.1.3.

- If RR_REG_TYPE is equal to '0011', indicating the mobile station request for dedicated traffic channels, the RRC of the MC-MAP base station shall inform the Upper Layers of this request. The base station may respond with a *R-TMSI Assignment Message* to inform the mobile station that it is registered at RR or to release RRC connection on common channels.

6.3.1.2.4 Traffic Channel Processing

The MC-MAP base station shall comply with the requirements specified in 3.6.4 of 3GPP2 C.S0005-A with the following modifications (in addition to modifications corresponding to those identified in 6.3.1.1.4):

The MC-MAP base station shall perform RRC connection release procedures as specified in section 6.3.2.1.2.

If requested by the Upper Layers, the MC-MAP base station RRC may perform direct transfer operation as specified in section 6.3.2.3.

The MC-MAP base station shall perform dedicated mode paging as specified in section 6.3.2.4.

The MC-MAP base station shall perform the establishment, reconfiguration, and release of radio bearers (RB) as specified in section 6.3.2.6.

The MC-MAP base station shall perform MS Capability Enquiry as specified in 6.3.2.2.
The MC-MAP base station shall perform Security Mode Control procedures as specified in 6.3.2.5.

6.3.2 Detailed RRC Functions

6.3.2.1 RRC Connection Procedures

6.3.2.1.1 RRC Connection Establishment

This section describes RRC connection establishment (providing the functions of 8.1.3 of 3GPP TS 25.331). RRC connection establishment procedures are performed while the mobile station is in the *Mobile Station Idle State* or *Access State* and the base station is in *Common Channel Processing State* or *Access Channel Processing State*.
The RRC connection establishment procedure establishes an RRC connection between the mobile station and the base station. The MC-MAP mobile station sends an *MC-MAP RRC Connection Request Message* on the r-csch. This message is used instead of the *Origination Message* and *Page Response Message*, defined in 2.6.3.3 and 2.6.3.5 of 3GPP2 C.S0005-A.
The RRC connection establishment procedure is started by a request from the MM sublayer or in response to a *General Page Message* from the base station. During the RRC connection establishment procedure, the MC-MAP mobile station shall update overhead system information as defined in 2.6.3.2 of 3GPP2 C.S0005-A and this document. The mobile station shall then send an *MC-MAP RRC Connection Request Message* to the base station as follows:

- If the RRC connection establishment is due to the request from the Upper Layers at the mobile station, then the MC-MAP mobile station shall send the *MC-MAP RRC Connection Request Message* from the *Origination Attempt Substate* of the *System Access State*.
- If the RRC connection establishment is due to receiving a *General Page Message*, then the MC-MAP mobile station shall send the *MC-MAP RRC Connection Request Message* from the *Page Response Substate* of the *System Access State*.

The *MC-MAP RRC Connection Request Message* is sent on the r-csch channel and contains (see 6.4.1.3.4 for details):

- An establishment cause: the establishment cause indicates to the base station the purpose of this RRC connection establishment request. If the "establishment cause" (as received from the Upper Layers or the "paging cause" of the *General Page Message*) can be mapped to one of the MC-MAP service options defined in C.R1001-A (i.e., Speech Call, CS Data Call, PS Data Call, or SMS), then the establishment cause is carried in the SERVICE_OPTION field of the *MC-MAP RRC Connection Request Message*; otherwise, the establishment cause is carried in the OTHER_ESTABLISH_CAUSE field of the *MC-MAP RRC Connection Request Message*
- The Mobile station capability, including types of channels supported.

On receipt of an *MC-MAP RRC Connection Request Message*, the base station may allocate a dedicated channel to the mobile station by sending an *Extended Channel Assignment Message* on the f-csch. In determining the

"establishment cause" of this RRC connection request, the base station shall make use of the MS_ORIG_IND, CAUSE_IND, SERVICE_OPTION, and OTHER_ESTABLISH_CAUSE fields of the *MC-MAP RRC Connection Request Message* (see 6.4.1.3.4 for definition of these fields).The *Extended Channel Assignment Message* contains (see 6.4.2.1.7 of this document and 2.6.3 of 3GPP2 C.S0005-A for details):

- The mobile station identification (as transmitted in the *MC-MAP RRC Connection Request Message* by the mobile station);
- The description of the assigned channel (channel configuration, frequency (optional), code channel, frame offset, Public Long Code Mask if PLCM_TYPE is set to '10'.)

The following restrictions apply to the *Extended Channel Assignment Message* for MC-MAP:

- MC-MAP uses ASSIGN_MODE of '000' and '100'.
- For ASSIGN_MODE of '000' or '100', BYPASS_ALERT_ANSWER is ignored, GRANTED_MODE is always set to '00', and ENCRYPT_MODE is always set to '00'.

The mobile station processes the *Extended Channel Assignment Message* according to 2.6.3.3, 2.6.3.4, and 2.6.3.5 of 3GPP2 C.S0005-A.

The following message flows show successful RRC connection establishment. If the RRC connection establishment procedure is successfully completed, the mobile station shall enter the *Mobile Station Control on the Traffic Channel State*.

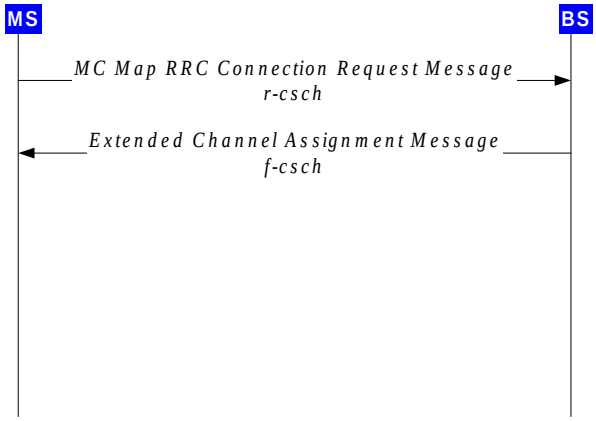

Figure 6.3.2.1.1-1: Successful RRC Connection Establishment (MS- originated) Procedure Message Flow

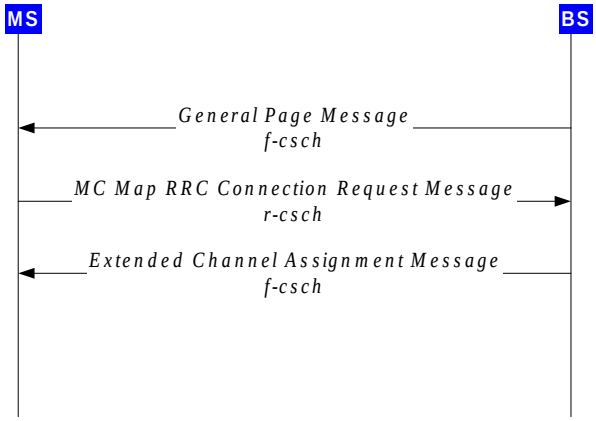

Figure 6.3.2.1.1-2: Successful RRC Connection Establishment (MS- terminated) Procedure Message Flow

6.3.2.1.1.1 Rejection of MC-MAP RRC Connection Request Message

If no channel is available for assignment, the base station may send to the mobile station a *Release Order* (Order Code = '010101', Order Qualification Code = '00000010') over the f-csch.

On receipt of a *Release Order* corresponding to one of its last *MC-MAP RRC Connection Request Message*s, the mobile station shall stop sending *MC-MAP RRC Connection Request Message*s and the mobile station shall return to idle mode. The base station may also reject the *MC-MAP RRC Connection Request Message* by sending a *Reorder Order*.

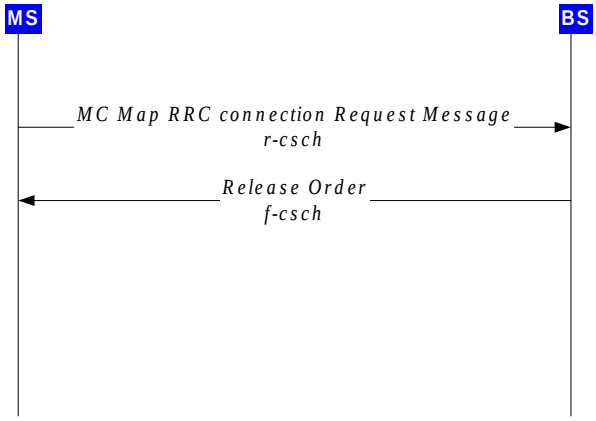

Figure 6.3.2.1.1.1-1: Unsuccessful RRC Connection Establishment Procedure Message Flow

6.3.2.1.2 RRC Connection Release

The purpose of this procedure is to release the RRC connection, including the signaling link and all radio bearers between the mobile station and the base station.

If the mobile station has a RRC connection while on the common channels, the base station shall send a *R-TMSI Assignment Message* with all the bits of R_TMSI_CODE set to '1' to release the RRC connection on the common channels. The mobile station shall respond with *R-TMSI Assignment Completion Message* to confirm the receipt of the message.

The RRC connection release procedure can also be performed while the mobile station is in the *Mobile Station Control on the Traffic Channel State* and the base station is in the *Traffic Channel Processing State*.

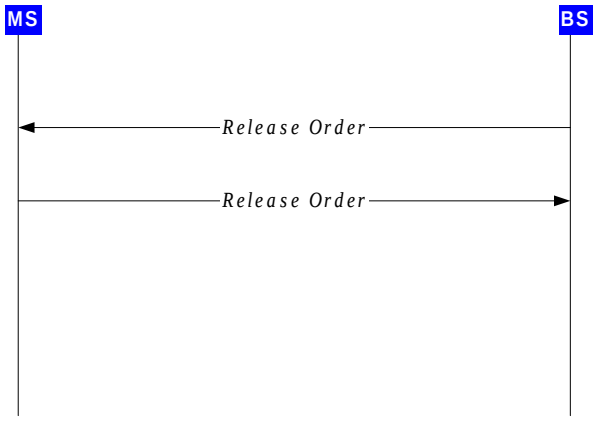

Figure 6.3.2.1.2-1. RRC Release Procedure

The base station shall perform the following procedures related to RRC connection release while in the *Traffic Channel Processing State*:

- To release an RRC connection, the base station shall first send an *R-TMSI Assignment Message* with all the bits of R_TMSI_CODE set to '1'. It shall then send an *Release Order* to the mobile station.
- When the base station receives a *Release Order* from the mobile station in response to the *Release Order* sent by the base station, it should release all mobile station dedicated resources.

The mobile station shall perform the following procedures related to RRC connection release:

- If the mobile station receives a *R-TMSI Assignment Message*, it shall process the message as described in 6.3.4.1.2.5 and respond with *R-TMSI Assignment Completion Message*.
- If the mobile station receives a *Release Order* while in the *Traffic Channel Substate* of the *Mobile Station Control on the Traffic Channel State*, the mobile station shall enter the *Release Substate* of *the Mobile Station Control on the Traffic Channel State* with a base station release indication, shall send a *Release Order* to the base station, and shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication.

6.3.2.2 Transmission of MS Capability Information

The mobile station capability update procedure is used by the mobile station to convey mobile station specific capability information to the base station.

MS Capability Transmission procedures are performed while the mobile station is in the *Mobile Station Idle State* or *Access State* and the base station is *in Common Channel Processing State* or *Access Channel Processing State* or while the mobile station is in the *Mobile Station Control on the Traffic Channel State* and the base station is in the *Traffic Channel Processing State*.

Figure 6.3.2.2-1. Mobile Station Capability Report Procedure

The mobile station shall perform the following procedures related to transmission of mobile station capability information:

- The mobile station shall initiate the mobile station capability update procedure upon receiving a *Status Request Message* from the base station.
- The mobile station shall send a *Status Response Message* (on r-dsch) or an *Extended Status Response Message* (on r-csch) to the base station, containing the appropriate information records(see Tables 6.4.4-1 and 6.4.4-2).

The base station shall perform the following procedures related to transmission of mobile station capability information:Upon reception of a *Status Response Message* (on r-dsch) or the *Extended Status Response Message* (on r-csch), the base station shall store the capability information received from the mobile station.

6.3.2.2.1 MS Capability Enquiry

The mobile station capability enquiry is used to request the mobile station to transmit its capability information related to any radio access network that is supported by the mobile station.

Figure 6.3.2.2.1-1. Mobile Station Capability Request Procedure

The base station shall perform the following procedure related to mobile station capability inquiry: The base station shall transmit a *Status Request Message* to the mobile station, with the RECORD_TYPE field(s) set to the type of the information record(s) requested (see Tables 6.4.4-1 and 6.4.4-2).

The mobile station shall perform the following procedure related to mobile station capability inquiry: Upon reception of a *Status Request Message*, the mobile station shall initiate the transmission of mobile station capability information, as specified in section 6.3.2.2.

6.3.2.3 Direct Transfer Procedures

The direct transfer procedure is used in both forward link and reverse link to carry all Upper Layer Non-Access Stratum messages over the radio interface.

RRC Connection Release procedures are performed while the mobile station is in the *Mobile Station Control on the Traffic Channel State* and the base station is in the *Traffic Channel Processing State*.

6.3.2.3.1 Initial Direct Transfer Procedures

In the MC-MAP system, initial direct transfer is implemented through the *MC-MAP Initial L3 Message*.

The *MC-MAP Initial L3 Message* carries the first Upper Layer Non-Access Stratum message in the NAS_INFO_DATA field of the message. The RRC entity at the receiving side is responsible for routing the encapsulated Upper Layer Non-Access Stratum message to the appropriate Upper Layer entity.

Figure 6.3.2.3.1-1. Initial Direct Transfer Procedure

The mobile station shall perform the following procedure related to Initial Direct Transfer:When the Upper Layers request the RRC to initiate a session and transfer a Non-Access Stratum message, the mobile station shall transmit the *MC-MAP Initial L3 Message*, with the Non-Access Stratum message encapsulated in the NAS_INFO_DATA field of the message. The mobile station shall set the CN_DOMAIN_ID field of the message to indicate which CN node the Non-Access Stratum message is destined to as shown in Table 6-5.1.1.3-1 , set the SERVICE_DESCRIPTOR field of the message to the appropriate service descriptor value as shown in Table 6-5.1.1.3-2, and set the FLOW_ID field to the flow identifier for this session.

The base station shall perform the following procedure related to Direct Transfer: Upon reception of an *MC-MAP Initial L3 Message* at the base station, the base station shall route the Non-Access Stratum message encapsulated within the received message to the correct Upper Layer entity, based upon the values of the CN_DOMAIN_ID, the SERVICE_DESCRIPTOR, and the FLOW_ID fields of the received message.

6.3.2.3.2 Forward Link and Reverse Link Direct Transfer Procedures

In the MC-MAP system, forward link and reverse link direct transfer is implemented through the *MC-MAP L3 Message*.

The *MC-MAP L3 Message* carries the Upper Layer Non-Access Stratum message in the NAS_INFO_DATA field of the message. The RRC entity at the receiving side is responsible for routing the encapsulated Upper Layer Non-Access Stratum message to the appropriate Upper Layer entity.

Figure 6.3.2.3.2-1. Base Station Initiated Direct Transfer Procedure

Figure 6.3.2.3.2-2. Mobile Station Initiated Direct Transfer Procedure

The mobile station shall perform the following procedures related to Direct Transfer:

- When the Upper Layers request the RRC to a transfer an Non-Access Stratum message, the mobile station shall transmit the *MC-MAP L3 Message*, with the Non-Access Stratum message encapsulated in the NAS_INFO_DATA field of the message. The mobile station shall set the CN_DOMAIN_ID field of the message to indicate which CN node the Non-Access Stratum message is destined to as shown in Table 6-5.1.1.3-1 , the SERVICE_DESCRIPTOR field of the message to the appropriate service descriptor value as shown in Table 6-5.1.1.3-2, and the FLOW_ID field to the flow identifier for this session.
- Upon reception of an *MC-MAP L3 Message* at the mobile station, the mobile station shall route the Non-Access Stratum message encapsulated within the received message to the correct Upper Layer entity, based upon the values of the CN_DOMAIN_ID, the SERVICE_DESCRIPTOR, and the FLOW_ID fields of the received message.

The base station shall perform the following procedures related to Direct Transfer:

- When the Upper Layers request the RRC to a transfer an Non-Access Stratum message, the base station shall transmit the *MC-MAP L3 Message*, with the Non-Access Stratum message encapsulated in the NAS_INFO_DATA field of the message. The base station shall set the CN_DOMAIN_ID field of the message to indicate which CN node the Non-Access Stratum message is originated from as shown in Table 6-5.1.1.3-1 , set the SERVICE_DESCRIPTOR field of the message to the appropriate service descriptor value as shown in Table 6-5.1.1.3-2, and set the FLOW_ID field to the flow identifier for this session.
- Upon reception of an *MC-MAP L3 Message* at the base station, the base station shall route the Non-Access Stratum message encapsulated within the received message to the correct CN domain, based upon the values of the CN_DOMAIN_ID, SERVICE_DESCRIPTOR, and FLOW_ID fields of the received message.

6.3.2.4 Dedicated Mode Paging

This procedure is used to page a mobile station while the mobile station is in the *Mobile Station Control on the Traffic Channel State* and the base station is in the *Traffic Channel Processing State*.

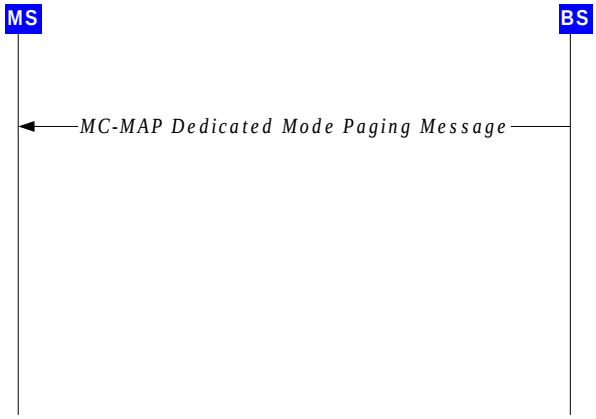

Figure 6.3.2.4-1. Dedicated Mode Paging Procedure

The base station shall perform the following procedure related to dedicated mode paging: If the Upper Layers in the network request paging of a mobile station that is in the *Mobile Station Control on the Traffic Channel State*, the base station should transmit an *MC-MAP Dedicated Mode Paging Message* to the mobile station, with the fields of the message set as follows:

- The CN_DOMAIN_ID field shall be set to the appropriate core network identifier as shown in Table 6.4.1.1.3-1.
- The SERVICE_OPTION field shall be set to the appropriate value of the service option number corresponding to the “paging cause” received from the Upper Layers.
- The PAGE_REC_TYPE_ID field shall be set to the appropriate value of the paging record type identifier as shown in Table 6.4.1.2.4-1.

The mobile station shall perform the following procedures related to dedicated mode paging:

- Upon reception of an *MC-MAP Dedicated Mode Paging Message*, the mobile station shall perform the following:
  - If $CN\_DOMAIN\_ID_r$ equals '00', the mobile station shall set the "CN domain identifier" parameter to "PSTN/ISDN"; if $CN\_DOMAIN\_ID_r$ equals '01', the mobile station shall set the "CN domain identifier" parameter to "IP"; otherwise, the mobile station shall set the "CN domain identifier" parameter to "Don't Care".
  - The mobile station shall set the "paging cause" parameter according to the value of the MC-MAP service option number given in the SERVICE_OPTION field.
  - If $PAGE\_REC\_TYPE\_ID_r$ equals '0000', the mobile station shall set the "paging record type identifier" parameter to "IMSI"; if $PAGE\_REC\_TYPE\_ID_r$ equals '0001', the mobile station shall set the "paging record type identifier" parameter to "TMSI"; if $PAGE\_REC\_TYPE\_ID_r$ equals '0010', the mobile station shall set the "paging record type identifier" parameter to "P-IMSI";.
  - The RRC shall indicate paging and forward the "paging cause" and the "paging record type identifier" to the Upper Layer entity indicated by the "CN domain identifier" parameter.

6.3.2.5 Security Mode Control

The mobile station may request to enable or disable encryption for a particular service option connection or for signaling encryption using the *Security Mode Request Message*. The *Security Mode Request Message* message specifies the following:

- The encryption algorithms supported by the mobile station for signaling and user information encryption,
- The service option connections (if any) that the mobile station is requesting to be encrypted, and
- A request for encrypting the signaling messages.

The base station sends to the mobile station the *Security Mode Command Message* which specifies the following:

- Encryption algorithm(s) to be used for encryption of signaling messages and user information,
- The activation time after which encryption is to commence as prescribed by this message,
- The core network domain (CS or PS core network) which identifies the key to be use, and
- The concealed 24 most significant bits of the crypto-sync used for encryption of signaling messages.

The base station may also determine the mobile station's ciphering capabilities through the *Status Request Message, Origination Message*. Therefore, the base station can autonomously send a *Security Mode Command Message* to the mobile station.

Figure 6.3.2.5-1 shows an example of security mode invocation by the mobile station.

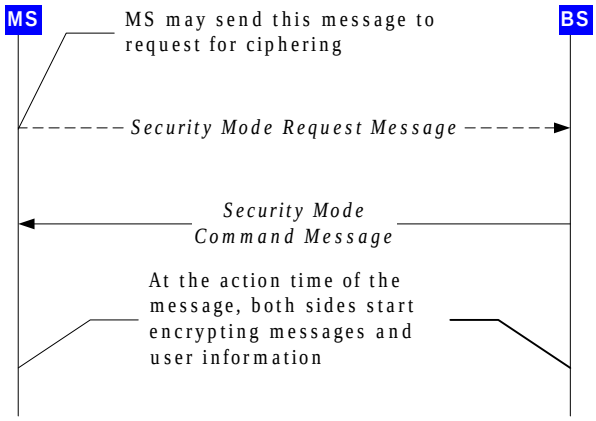

Figure 6.3.2.5-1. Example of Security Mode Control Flow Diagram

The mobile station and the base station shall perform Extended-Encryption for Signaling Message and User Information as specified in 2.3.12.4 of 3GPP2 C.S0005-A.

The mobile station shall recover the value of the 24 MSB of the crypto-sync used for extended-encryption of signaling messages from the concealed crypto-sync received in the *Security Mode Command Message* by XORing the 24 MSB of the AK (anonymity key) with the CONC_EXT_SEQ_H_r.

6.3.2.6 Radio Bearer Control Procedures

Radio Bearer Control procedures are performed while the mobile station is in the *Mobile Station Control on the Traffic Channel State* and the base station is in the *Traffic Channel Processing State*.

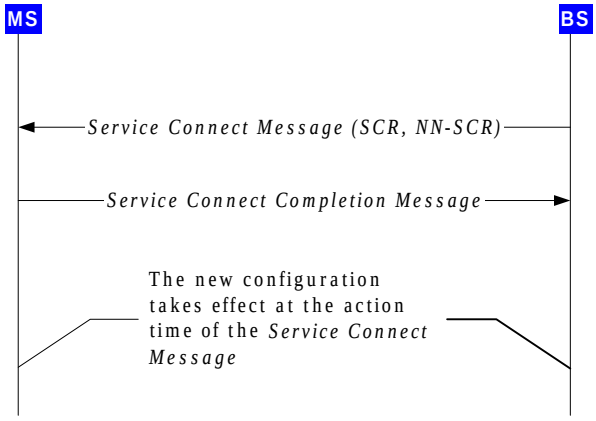

Figure 6.3.2.5-2 Successful Case

Figure 6.3.2.5-3 Unsuccessful Case

6.3.2.6.1 Radio Bearer Establishment

The purpose of this procedure is to establish new radio bearer(s).
The base station shall perform the following procedures related to radio bearer establishment:

- If the Upper Layer in the network request establishment of radio bearer(s), the base station shall transmit a *Service Connect Message* (with the Service Configuration Record and the Non-Negotiable Service Configuration Record included). The SERVICE_OPTION field of the service option connection record entry for the new radio bearer specifies the new radio bearer type and the CON_REF field specifies an identifier for this radio bearer. The base station shall also include the core domain identity, NAS binding info, and radio bearer identity (as specified by the Upper Layers) in the CN_DOMAIN_ID, NAS_BINDING_INFO, and RB_ID fields of the Service Configuration Record, respectively, for the new radio bearer. For all already existing radio bearers, the base station should not include the CN_DOMAIN_ID and NAS_BINDING_INFO fields in the service option connection record entry corresponding to those radio bearers (as specified in 6.4.4.2)
- The base station should take the mobile station capabilities into account when setting the new configuration.
- When the base station has received the *Service Connect Completion Message*, the base station may delete any old configuration. The accepted configuration takes effect at the action time of the *Service Connect Message*.

The mobile station shall perform the following procedure related to radio bearer establishment:Upon reception of a *Service Connect Message*, the mobile station shall perform actions as specified in 6.3.1.1.5.6. If the mobile station accepts the new configuration, the mobile station shall transmit a *Service Connect Completion Message* and shall enter the *Normal Service subfunction*; the received configuration takes effect at the action time of the *Service Connect Message*. If the mobile station does not support the new configuration, the mobile station shall transmit a *Mobile Station Reject Order* (ORDQ = '00000111') and shall enter the *Normal Service subfunction*.

6.3.2.6.2 Radio Bearer Reconfiguration

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer or the signaling link to reflect a change in QoS.
The base station shall perform the following procedures related to radio bearer reconfiguration:

- The base station shall transmit a *Service Connect Message*. The parameters of the Service Configuration Record and the Non-Negotiable Service Configuration Record included in this message specify the reconfigured radio bearers.
- The base station should take the mobile station capabilities into account when setting the new configuration.
- When the base station has received the *Service Connect Completion Message*, the base station may delete the old configuration. The new configuration takes effect at the action time of the *Service Connect Message*.

The mobile station shall perform the following procedure related to radio bearer reconfiguration:Upon reception of a *Service Connect Message* specifying radio bearer reconfiguration, the mobile station shall perform actions as specified in 6.3.1.1.5.6. If the mobile station accepts the reconfiguration, the mobile station shall transmit a *Service Connect Completion Message* on and shall enter the *Normal Service subfunction*; the new configuration takes effect at the action time of the *Service Connect Message*. If the mobile station does not support the reconfiguration, the mobile station shall transmit a *Mobile Station Reject Order* (ORDQ = '00000111') and shall enter the *Normal Service subfunction*.

6.3.2.6.3 Radio Bearer Release

The purpose of this procedure is to release existing radio bearer(s).

The base station shall perform the following procedures related to radio bearer release:

- If the Upper Layer in the network requests release of radio bearer(s), the base station shall transmit a *Service Connect Message* (with the Service Configuration Record and the Non-Negotiable Service Configuration Record included). The base station shall omit the CON_REF (and the corresponding service option connection record entry) for the radio bearer(s) to be released.
- The base station should take the mobile station capabilities into account when setting the new configuration.
- When the base station has received the *Service Connect Completion Message*, the base station may delete any old configuration. The new configuration takes effect at the action time of the *Service Connect Message*.

The mobile station shall perform the following procedure related to radio bearer release:Upon reception of a *Service Connect Message*, the mobile station shall perform actions as specified in6.3.1.1.5.6. If the mobile station accepts the new configuration, the mobile station shall transmit a *Service Connect Completion Message* and shall enter the *Normal Service subfunction*; the new configuration takes effect at the action time of the *Service Connect Message*. If the mobile station does not support the new configuration, the mobile station shall transmit a *Mobile Station Reject Order* (ORDQ = '00000111') and shall enter the *Normal Service subfunction*.

6.3.2.7 RRC Connection Mobility Procedures

When the MC-MAP mobile station successfully sends an *RRC Connection Request Messag*e, the base station can infer the mobile station's location and hence mobile station performs implicit RR-level registration. The base station should notify the mobile station that it is registered at RR level by sending *R-TMSI Assignment Message* with a valid R-TMSI.

While the RRC connection is established and the MC-MAP mobile station is *in Traffic Channel Substate*, it implicitly performs Traffic Channel RR-level Registration. The base station may notify the mobile station that it is registered at RR level by sending *R-TMSI Assignment Message*. The base station may also assign the mobile a new R-TMSI.

If the call is timed out, the base station may direct the MC-MAP mobile station to common channels by sending a *Release Order*. RRC connection on common channels is achieved by maintaining the RR-level registration of the mobile station and a valid R-TMSI. While monitoring the common channels, the MC-MAP mobile station shall perform periodic, zone-based or ordered RR-level registration as specified in 6.3.2. by sending *RR-level Registration Message*.

The base station may accept the registration and allocate the mobile station a new R-TMSI by sending the *R-TMSI Assignment Message*. If the base station sends the mobile station *RTMSI Assignment Message* with all bits of R_TMSI_CODE set to '1', the mobile station shall set all bits of $R\_TMSI\_CODE_S$ to '1' and shall set

RR_REG_ENABLED$_S$ to ‘NO’. When this message with all bits of R_TMSI_CODE set to ‘1’ is sent, the connection of the mobile station gets closed on all layers of access stratum till a RRC Connection is established. If the mobile station does a periodic RR-registration in the same R-TMSI zone as the one in which in has already registered, the base station may or may not assign it a new R-TMSI. If the mobile station registers at RR in a new R-TMSI zone, the base station shall assign it a new R-TMSI or reject RR- registration by sending *R-TMSI Assignment Message*.
Exact requirements related to RR-level registration are specified in 6.3.2.

6.3.3 Handoff Procedures

6.3.3.1 Soft Handoff

See 2.6.6.1 and 2.6.6.2 of 3GPP2 C.S0005-A.

6.3.3.2 Inter-System MC-MAP to GSM Handoff

6.3.3.2.1 Mobile Station Procedures

6.3.3.2.1.1 Processing of Forward Traffic Channel Handoff Messages

1. *MC-MAP GSM Handover Command Message*: The mobile station shall process the message as follows:
   When the message takes effect, the mobile station shall:
   - If GSM_T_REF_INCL is equal to ‘1’, store the following parameters:
     - CDMA time (CDMA_TIME$_S$ = CDMA_TIME$_r$)
     - GSM frame number (GSM_FRAME$_S$ = GSM_FRAME$_r$)
     - GSM frame fraction (GSM_FRACT$_S$ = GSM_FRACT$_r$)
   - Process the GSM_INFO_LEN and GSM_INFO_DATA fields of the message in accordance with the requirements stated in GSM 04.08.
2. *Candidate Frequency Search Request Message*: The mobile station shall process the message as follows:
   If SEARCH_MODE$_r$ is equal to ‘0000’ or ‘0001’, the mobile station shall process the message as specified in 2.6.6.2.5.1 of 3GPP2 C.S0005-A.
   If SEARCH_MODE$_r$ is equal to ‘0010’, and if the mobile station supports GSM channel searching, the mobile station shall process the *Candidate Frequency Search Request Message* as follows:
   - The mobile station shall send a *Mobile Station Reject Order* with the ORDQ field set to ‘0001101’ (search period too short), if SEARCH_TYPE$_r$ is equal to ‘11’ and *search_period* is less than (max (*fwd_time, rev_time*) + T_{71m}) seconds where *search_period*, *fwd_time* and *rev_time* are defined below.
     (In the following, *rec_search_set* is the set of GSM channels specified in the *Candidate Frequency Search Request Message*.)
     search_period = time period corresponding to SEARCH_PERIOD$_r$ shown in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A.
     fwd_time = the mobile station’s estimate of the total length of time, in seconds, for which the mobile station will need to suspend its current Forward Traffic Channel processing in order to tune to each GSM channel in *rec_search_set* and measure its strength, and to re-tune to the Serving Frequency; if the mobile station searches *rec_search_set* in multiple

visits, *fwd_time* is the total time for all visits away from the Serving Frequency in a search period

rev_time = the mobile station's estimate of the total length of time, in seconds, for which the mobile station will need to suspend its current Reverse Traffic Channel processing in order to tune to each GSM channel in *rec_search_set* and measure its strength, and to re-tune to the Serving Frequency; if the mobile station searches *rec_search_set* in multiple visits, *rev_time* is the total time for all visits away from the Serving Frequency in a search period

- If the mobile station does not send a *Mobile Station Reject Order* in response to the *Candidate Frequency Search Request Message*, it shall perform the following:
  - The mobile station shall send a *Candidate Frequency Search Response Message* in assured mode within T_{56m} seconds of receiving the *Candidate Frequency Search Request Message*. The mobile station shall set the fields of the *Candidate Frequency Search Response Message* as follows:
    + The mobile station shall set TOTAL_OFF_TIME_FWD and TOTAL_OFF_TIME_REV to its estimate of the total number of frames or power control groups for which it will need to suspend its current Forward Traffic Channel processing and Reverse Traffic Channel processing, respectively, in order to tune to each GSM channel in *rec_search_set*, and to re-tune to the Serving Frequency. If the mobile station searches *rec_search_set* in multiple visits away from the Serving Frequency, the mobile station shall report the total number of frames or power control groups in all visits in a search period for which it will need to suspend its current Forward Traffic Channel and the Reverse Traffic Channel processing.
    + The mobile station shall set MAX_OFF_TIME_FWD and MAX_OFF_TIME_REV to its estimate of the maximum number of frames or power control groups for which it will need to suspend its current Forward Traffic Channel processing and Reverse Traffic Channel processing, respectively, during any single visit away from the Serving Frequency, to search a subset of *rec_search_set*, and to re-tune to the Serving Frequency.
    + The mobile station shall set PCG_OFF_TIMES to '1' if TOTAL_OFF_TIME_FWD, MAX_OFF_TIME_FWD, TOTAL_OFF_TIME_-FWD and MAX_OFF_TIME_FWD are expressed in units of power control groups. If these time estimates are expressed in units of frames, the mobile station shall set PCG_OFF_TIMES to '0'.

+ If $ALIGN\_TIMING_r$ is equal to '1', the mobile station shall set ALIGN_TIMING_USED to '1' to indicate that it will align its search as requested by the base station; otherwise, the mobile station shall set ALIGN_TIMING_USED to '0'. If ALIGN_TIMING_USED is set to '1', the mobile station shall set NUM_VISITS to the number of visits per search period minus one and, if NUM_VISITS is not equal to 0, the mobile station shall set INTER_VISIT_TIME, in units of frames or power control groups, to its estimate of the time between subsequent visits within the same search period.

– When the message takes effect, the mobile station shall perform the following actions:

+ If any periodic search is in progress, the mobile station shall abort it (see 2.6.6.2.8.3.4 and 2.6.6.2.10.4 of 3GPP2 C.S0005-A and 6.6.3.2.1.2.4 of this document).

+ If $SEARCH\_TYPE_r$ is equal to '00', the mobile station may stop maintaining the average of the Serving Frequency received power that is used in the handoff and search procedures.

+ If $SEARCH\_TYPE_r$ is equal to '01' or '11', and the mobile station uses received power measurements in the search procedure, it should start monitoring the received power on the Serving Frequency, if it is not already doing so. While it is tuned to the Serving Frequency, the mobile station should measure the received power once every frame (0.02 seconds), and should maintain an average of the received power over the last N_{12m} frames.

+ Store the following parameters from the *Candidate Frequency Search Request Message:*

  o Candidate Frequency Search Request Message sequence number ($CFSRM\_SEQ_s = CFSRM\_SEQ_r$)

  o Periodic search flag: If $SEARCH\_TYPE_r$ is equal to '11', the mobile station shall set $PERIODIC\_SEARCH_s$ to '1'; otherwise, the mobile station shall set $PERIODIC\_SEARCH_s$ to '0'.

  o Search period for the GSM Channels search ($SEARCH\_PERIOD_s = SEARCH\_PERIOD_r$)

  o Candidate Frequency search mode ($SEARCH\_MODE_s = SEARCH\_MODE_r$)

  o Serving Frequency total pilot E_c threshold ($SF\_TOTAL\_EC\_THRESH_s = SF\_TOTAL\_EC\_THRESH_r$)

  o Serving Frequency total pilot E_c/I_o threshold ($SF\_TOTAL\_EC\_IO\_THRESH_s = SF\_TOTAL\_EC\_IO\_THRESH_r$)

- o GSM RXLEV threshold
  ($GSM\_RXLEV\_THRESH_s = GSM\_RXLEV\_THRESH_r$)
- o Base transceiver station identity code verification required indicator
  ($BSIC\_VERIF\_REQ_s = BSIC\_VERIF\_REQ_r$)
- o Network color code
  ($N\_COL\_CODE_s = N\_COL\_CODE_r$)
- o If GSM_T_REF_INCL is equal to '1', store the CDMA time
  ($CDMA\_TIME_s = CDMA\_TIME_r$)
- o Candidate Frequency GSM Search Set: The mobile station shall replace the Candidate Frequency GSM Search Set with the GSM channels included in the *Candidate Frequency Search Request Message*. For each GSM channel specified in the message, the mobile station shall store the following:
  - ◊ GSM frequency band (GSM_FREQ_BAND)
  - ◊ Absolute Radio Frequency Channel Number (ARFCN).
  - ◊ If GSM_T_REF_INCL is equal to '1', store the GSM frame number (GSM_FRAME)
  - ◊ If GSM_T_REF_INCL is equal to '1', store the GSM frame fraction (GSM_FRACT)
- o If $ALIGN\_TIMING_r$ is equal to '1', store the search offset time
  ($SEARCH\_OFFSET_s = SEARCH\_OFFSET_r$)

+ If $ALIGN\_TIMING_r$ is equal to '1' and the mobile station will align its search as requested by the base station, the mobile station shall set $ALIGN\_TIMING\_USED_s$ to '1'; otherwise, the mobile station shall set $ALIGN\_TIMING\_USED_s$ to '0'.

+ If the mobile station uses power control groups as the unit of delay, it shall set $SEARCH\_TIME\_RESOLUTION_s$ to 0.00125; otherwise, it shall set $SEARCH\_TIME\_RESOLUTION_s$ to 0.02.

+ If $SEARCH\_TYPE_r$ is equal to '01', the mobile station shall perform a single search of the Candidate Frequency GSM Search Set as described in 6.6.3.2.1.2.1 of this document. If $SEARCH\_TYPE_r$ is equal to '11', the mobile station shall perform the periodic search procedures described in 6.6.3.2.1.2.2 of this document.

3. *Candidate Frequency Search Control Message*: The mobile station shall process the message as follows:

If $SEARCH\_MODE_r$ is equal to '0000' or '0001', the mobile station shall process the message as specified in 6.6.6.2.5.1 of 3GPP2 C.S0005-A.

If $SEARCH\_MODE_s$ is equal to '0010':

- The mobile station shall send a *Mobile Station Reject Order* with the ORDQ field

set to '00001010' (search set not specified), if $SEARCH\_TYPE_r$ is not equal to '00' and the Candidate Frequency GSM Search Set is empty.

- The mobile station shall send a *Mobile Station Reject Order* with the ORDQ field set to '0001101' (search period too short), if $SEARCH\_TYPE_r$ is equal to '11' and *search_period* is less than (max (*fwd_time*, *rev_time*) + T_{71m}) seconds, where

  search_period = time period corresponding to $SEARCH\_PERIOD_r$ shown in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A,

  fwd_time = the mobile station's estimate of the total length of time, in seconds, for which the mobile station will need to suspend its current Forward Traffic Channel processing in order to tune to each GSM channel in the Candidate Frequency GSM Search Set and measure its strength, and to re-tune to the Serving Frequency; if the mobile station searches the Candidate Frequency GSM Search Set in multiple visits, *fwd_time* is the total time for all visits away from the Serving Frequency in a search period (see 6.3.3.2.1.2.2),

  and

  rev_time = the mobile station's estimate of the total length of time, in seconds, for which the mobile station will need to suspend its current Reverse Traffic Channel processing in order to tune to each GSM channel in the Candidate Frequency GSM Search Set and measure its strength, and to re-tune to the Serving Frequency; if the mobile station searches the Candidate Frequency GSM Search Set in multiple visits, *rev_time* is the total time for all visits away from the Serving Frequency in a search period (see 6.3.3.2.1.2.2).

- If the mobile station does not reject the *Candidate Frequency Search Control Message*, it shall perform the following actions when the message takes effect:

  – If any periodic search is in progress, the mobile station shall abort it (see 2.6.6.2.8.3.4and 2.6.6.2.10.4 of 3GPP2 C.S0005-A and 6.6.3.2.1.2.4 of this document).

  – If $SEARCH\_TYPE_r$ is equal to '00':

    + The mobile station shall set $PERIODIC\_SEARCH_s$ to '0'.

    + The mobile station may stop maintaining the average of the Serving Frequency received power that is used in the handoff and search procedures.

  – If $SEARCH\_TYPE_r$ is equal to '01':

    + The mobile station shall set $PERIODIC\_SEARCH_s$ to '0'.

    + If mobile station uses received power measurements in the search procedure, it should start monitoring the received power on the Serving Frequency, if it is not already doing so. While it is tuned to the Serving Frequency, the mobile station should measure the received power once every frame (0.02 seconds), and should maintain an average of the received power over the last N_{12m} frames.

+ The mobile station shall perform a single search of the Candidate Frequency GSM Search Set, as described in 6.6.3.2.1.2.1.of this document.

– If $SEARCH\_TYPE_r$ is equal to '11':

+ The mobile station shall set $PERIODIC\_SEARCH_S$ to '1'.

+ If mobile station uses received power measurements in the search procedure, it should start monitoring the received power on the Serving Frequency, if it is not already doing so. While it is tuned to the Serving Frequency, the mobile station should measure the received power once every frame (0.02 seconds), and should maintain an average of the received power over the last N_{12m} frames.

+ The mobile station shall perform the periodic search procedures for the Candidate Frequency GSM Search Set, as described in 6.6.3.2.1.2.2 of this document.

6.3.3.2.1.2 Search of GSM Channels

If $SEARCH\_MODE_S$ is equal to '0001', and if the mobile station supports GSM channel searching, the mobile station shall do the following: If $PERIODIC\_SEARCH_S$ is equal to '0', the mobile station shall search the Candidate Frequency GSM Search Set once, as described in 6.6.3.2.1.2.1 of this document; otherwise, the mobile station shall search the Candidate Frequency GSM Search Set periodically, as described in 6.6.3.2.1.2.2 of this document.

6.3.3.2.1.2.1 GSM Channels Single Search

The mobile station does a single search of the Candidate Frequency GSM Search Set by performing the following actions at the action time of the *Candidate Frequency Search Control Message* or the *Candidate Frequency Search Request Message:*

- The mobile station shall measure the strength of all GSM channels in the Candidate Frequency GSM Search Set in one or more visits away from the Serving Frequency, as described in 6.6.3.2.1.2.3 of this document.
- If $ALIGN\_TIMING\_USED_S$ is set to '1', the mobile station shall schedule visits to the Candidate Frequency as follows:
  - The mobile station shall make the first visit away from the Serving Frequency schedule at ($0.00125 \times SEARCH\_OFFSET_S$) seconds after the action time of the *Candidate Frequency Search Request Message* or the *Candidate Frequency Search Control Message* that started the search.
  - If the mobile station makes multiple visits away from the Serving Frequency, the mobile station shall schedule the second and each subsequent visit to occur ($SEARCH\_TIME\_RESOLUTION_S \times$ *inter_visit_time*) seconds after the previous visit, where *inter_visit_time* is the value of the INTER_VISIT_TIME field of the last *Candidate Frequency Search Response Message* sent by the mobile station.
- The mobile station shall complete the measurements and send a *Candidate Frequency Search Report Message* within *freshness_interval* seconds after the action time of the *Candidate Frequency Search Control Message* or *the Candidate Frequency Search Request Message*, where *freshness_interval* is determined as

follows:

– If the value of the TOTAL_OFF_TIME_FWD field or of the TOTAL_OFF_TIME_REV field of the last *Candidate Frequency Search Response Message* sent by the mobile station to the base station is greater than or equal to $\lceil (T_{70m} - T_{71m}) / \text{SEARCH\_TIME\_RESOLUTION}_s \rceil$, then

$$\textit{freshness\_interval} = \max(\textit{fwd\_time}, \textit{rev\_time}) + T_{71m} \text{ seconds},$$

where

$$\textit{fwd\_time} = \text{SEARCH\_TIME\_RESOLUTION}_s \times (\text{value of the TOTAL\_OFF\_TIME\_FWD field of the last } \textit{Candidate Frequency Search Response Message} \text{ sent by the mobile station}),$$

and

$$\textit{rev\_time} = \text{SEARCH\_TIME\_RESOLUTION}_s \times (\text{value of the TOTAL\_OFF\_TIME\_REV field of the last } \textit{Candidate Frequency Search Response Message} \text{ sent by the mobile station}).$$

– Otherwise,

$$\textit{freshness\_interval} = T_{70m} \text{ seconds}.$$

The mobile station shall set the fields of the *Candidate Frequency Search Report Message* as follows:

– The mobile station shall report the received power on the Serving Frequency in the SF_TOTAL_RX_PWR field.

– For each GSM channel whose received power measures above GSM_RXLEV_TRESH_s, the mobile station shall report its GSM Frequency band, Absolute Radio Frequency channel number, base transceiver identity code and the GSM RXLEV (as defined in section 8.1.4 of GSM 05.08), in the GSM_FREQ_BAND, ARFCN, BSIC and GSM_RXLEV fields, respectively..

• The mobile station may stop maintaining the average of the Serving Frequency received power that is used in the handoff and search procedures.

6.3.3.2.1.2.2 GSM Channels Periodic Search

When the mobile station performs a periodic search, it periodically searches the Candidate Frequency GSM Search Set, and reports the results to the base station in the *Candidate Frequency Search Report Message*, as described in this section. The mobile station may measure all GSM channels in the Candidate Frequency GSM Search Set in one visit away from the Serving Frequency, or it may make multiple visits in a search period, each time measuring all or some of the GSM channels in the Candidate Frequency GSM Search Set, as described in 6.6.3.2.1.2.3 of this document.

If $\text{SF\_TOTAL\_EC\_THRESH}_s$ is not equal to '11111', while the mobile station is tuned to the Serving Frequency, the mobile station shall measure the total received power spectral density, in mW/1.23 MHz, on the Serving Frequency at least once every frame (0.02 second) and shall maintain the average of the spectral density (*spec_density*) over the last N_{12m} frames.

(In the following, $(E_c/I_o)_{total}$ is the total E_c/I_o of the pilots in the Active Set, measured as specified in 2.6.6.2.2, and *total_ec* is defined as $(10 \times \log_{10} ((E_c/I_o)_{total} \times \textit{spec\_density}))$.)

The mobile station shall maintain a periodic search timer as follows:

• When the mobile station starts a periodic search, it shall set the periodic search

timer to the value in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A corresponding to $SEARCH\_PERIOD_S$ and shall enable the timer. If $ALIGN\_TIMING\_USED_S$ is set to '1', then the mobile station shall begin the first search ($0.00125 \times SEARCH\_OFFSET_S$) seconds after the action time of the *Candidate Frequency Search Request Message* or the *Candidate Frequency Search Control Message* that started the search; otherwise, the mobile station shall begin the first search at the action time of the *Candidate Frequency Search Request Message* or the *Candidate Frequency Search Control Message* that started the search.

- When the periodic search timer expires, the mobile station shall reset the periodic search timer to the value in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A corresponding to $SEARCH\_PERIOD_S$ and shall re-enable the timer.

- If $ALIGN\_TIMING\_USED_S$ is set to '0', $SF\_TOTAL\_EC\_THRESH_S$ is not equal to '11111' and $SF\_TOTAL\_EC\_IO\_THRESH_S$ is equal to '11111', the mobile station shall perform the following actions once per frame:

  – Disable the periodic search timer if *total_ec* is not less than $(-120 + 2 \times SF\_TOTAL\_EC\_THRESH_S)$.

  – Reset the expiration time of the periodic search timer to the value in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A corresponding to $SEARCH\_PERIOD_S$, and re-enable the timer if both of the following conditions are true:

    + the periodic search timer is disabled, and

    + *total_ec* is less than $(-120 + 2 \times SF\_TOTAL\_EC\_THRESH_S)$.

- If $ALIGN\_TIMING\_USED_S$ is set to '0', $SF\_TOTAL\_EC\_THRESH_S$ is equal to '11111' and $SF\_TOTAL\_EC\_IO\_THRESH_S$ is not equal to '11111', the mobile station shall perform the following actions once per frame:

  – Disable the periodic search timer if $(-20 \times \log_{10} (E_c/I_o)_{total})$ is not greater than $SF\_TOTAL\_EC\_IO\_THRESH_S$.

  – Reset the expiration time of the periodic search timer to the value in Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A corresponding to $SEARCH\_PERIOD_S$, and re-enable the timer if the following conditions are true:

    + the periodic search timer is disabled, and

    + $(-20 \times \log_{10} (E_c/I_o)_{total})$ is greater than $SF\_TOTAL\_EC\_IO\_THRESH_S$.

- If $ALIGN\_TIMING\_USED_S$ is set to '0', $SF\_TOTAL\_EC\_THRESH_S$ is not equal to '11111', and if $SF\_TOTAL\_EC\_IO\_THRESH_S$ is not equal to '11111', the mobile station shall perform the following actions once per frame:

  – Disable the periodic search timer if both of the following conditions are true:

    + *total_ec* is not less than $(-120 + 2 \times SF\_TOTAL\_EC\_THRESH_S)$, and

    + $(-20 \times \log_{10} (E_c/I_o)_{total})$ is not greater than $SF\_TOTAL\_EC\_IO\_THRESH_S$.

  – Reset the expiration time of the periodic search timer to the value in

Table 2.6.6.2.8.3.2-1 of 3GPP2 C.S0005-A corresponding to $SEARCH\_PERIOD_S$, and re-enable the timer if any of the following conditions are true:

+ the periodic search timer is disabled, and
+ *total_ec* is less than $(-120 + 2 \times SF\_TOTAL\_EC\_THRESH_S)$, or $(-20 \times \log_{10} (E_c/I_o)_{total})$ is greater than $SF\_TOTAL\_EC\_IO\_THRESH_S$.

- The mobile station shall maintain the periodic search timer independent of the total E_c and the total E_c/I_o of the pilots in the Serving Frequency Active Set, if any of the following conditions is true:
  - $ALIGN\_TIMING\_USED_S$ is set to '1, or
  - $SF\_TOTAL\_EC\_THRESH_S$ is equal to '11111', and $SF\_TOTAL\_EC\_IO\_THRESH_S$ is equal to '11111'.

If the periodic search timer is enabled, the mobile station shall perform the following actions before the timer expires:

- The mobile station shall measure the strength of all GSM channels in the Candidate Frequency GSM Search Set at least once in one or more visits away from the Serving Frequency, as described in 6.3.3.2.1.2.3 of this document.
- If $ALIGN\_TIMING\_USED_S$ is set to '1', the mobile station shall schedule visits away from the Serving Frequency as follows:
  - The mobile station shall make the first visit away from the Serving Frequency when the search period begins, i.e., when the periodic search timer is reset.
  - If the mobile station makes multiple visits away from the Serving Frequency during a search period, it shall schedule the second and each subsequent visit within the same search period to occur ($SEARCH\_TIME\_RESOLUTION_S \times$ *inter_visit_time*) seconds after the previous visit, where *inter_visit_time* is the value of the INTER_VISIT_TIME field of the last *Candidate Frequency Search Response Message* sent by the mobile station.
  - The mobile station shall abort a scheduled visit away from the Serving Frequency if at the scheduled time, one or both of the following conditions hold:
    + $SF\_TOTAL\_EC\_THRESH_S$ is not equal to '11111', and *total_ec* is not less than $(-120 + 2 \times SF\_TOTAL\_EC\_THRESH_S)$, or
    + $SF\_TOTAL\_EC\_IO\_THRESH_S$ is not equal to '11111', and $(-20 \times \log_{10} (E_c/I_o)_{total})$ is not greater than $SF\_TOTAL\_EC\_IO\_THRESH_S$.
  - If the mobile station aborts a scheduled visit during a search period, it may abort all remaining scheduled visits in that search period.
- The mobile station shall send a *Candidate Frequency Search Report Message* with the fields of the message set as follows:
  - The mobile station shall report the received power on the Serving Frequency in the SF_TOTAL_RX_PWR field.

– For each GSM channel whose received power measures above $GSM\_RXLEV\_TRESH_S$, the mobile station shall report its GSM Frequency band, Absolute Radio Frequency channel number, base transceiver identity code and the GSM RXLEV (as defined in section 8.1.4 of GSM 05.08), in the GSM_FREQ_BAND, ARFCN, BSIC and GSM_RXLEV fields, respectively..

- The mobile station shall ensure that the strength measurements for all GSM channels in the Candidate Frequency GSM Search Set were obtained within *freshness_interval* before the *Candidate Frequency Search Report Message* is sent, where *freshness_interval* is determined as follows:

  – If the value of the TOTAL_OFF_TIME_FWD field or of the TOTAL_OFF_TIME_REV field of the last *Candidate Frequency Search Response Message* sent by the mobile station to the base station is greater than or equal to $\lceil (T_{70m} - T_{71m}) / SEARCH\_TIME\_RESOLUTION_S \rceil$, then

$$freshness\_interval = \max(fwd\_time, rev\_time) + T_{71m} \text{ seconds},$$

  where

$$fwd\_time = SEARCH\_TIME\_RESOLUTION_S \times$$ (value of the TOTAL_OFF_TIME_FWD field of the last *Candidate Frequency Search Response Message* sent by the mobile station),

  and

$$rev\_time = SEARCH\_TIME\_RESOLUTION_S \times$$ (value of the TOTAL_OFF_TIME_REV field of the last *Candidate Frequency Search Response Message* sent by the mobile station).

– Otherwise,

$$freshness\_interval = T_{70m} \text{ seconds}.$$

6.3.3.2.1.2.3 GSM Channel Measurements

The mobile station measures the strength of all GSM channels in the Candidate Frequency GSM Search Set in one or more visits away from the Serving Frequency. The mobile station shall perform the following actions during each visit away from the Serving Frequency to measure GSM channel signal strengths:

- If the mobile station is processing the Forward Fundamental Channel, the mobile station shall stop processing the Forward Fundamental Channel. If the mobile station is transmitting on the Reverse Fundamental Channel, the mobile station shall stop transmitting on Reverse Fundamental Channel.
- If the mobile station is processing the Forward Dedicated Control Channel, the mobile station shall stop processing Forward Dedicated Control Channel. If the mobile station is transmitting on the Reverse Dedicated Control Channel, the mobile station shall stop transmitting on Reverse Dedicated Control Channel.
- The mobile station shall stop processing the Forward Supplemental Code Channels and Forward Supplemental Channels (if any). The mobile station shall stop transmitting on the Reverse Supplemental Code Channels and Reverse Supplemental Channels (if any).
- The mobile station shall disable the fade timer (see 2.6.4.1.8 of 3GPP2 C.S0005-A)

and the handoff drop timers corresponding to its current Active Set and Candidate Set (see 2.6.6.2.3 of 3GPP2 C.S0005-A), and shall suspend incrementing TOT_FRAMES_S and BAD_FRAMES_S (see 2.6.4.1.1 of 3GPP2 C.S0005-A).

- If Rate Set 2 is in use on the Reverse Traffic Channel, the mobile station shall store the erasure indicator bits for the last two frames received on the Forward Traffic Channel (see 2.1.2.3.1 of 3GPP2 C.S0002-A).
- The mobile station shall lock the accumulation of valid level changes in the closed loop mean output power and shall ignore received power control bits related to the period that the transmitter is disabled (see 3GPP2 C.S0002-A).
- The mobile station shall tune to one of the GSM channels in the Candidate Frequency GSM Search Set.
  - If $BSIC\_VERIF\_REQ_S$ is equal to '0', the mobile station shall measure the received power on the GSM channel and read its base transceiver identity code.
  - If $BSIC\_VERIF\_REQ_S$ is equal to '1', and if Network Color Code received on the channel is equal to $N\_COL\_CODE_S$, the mobile station shall measure the received power on the GSM channel and read its base transceiver identity code.
- The mobile station shall include a GSM channel in the *Candidate Frequency Search Report Message* if the received power on the GSM channel measures above $GSM\_RXLEV\_THRESH_S$.
- The mobile station may tune to other GSM channels in the Candidate Frequency GSM Search Set and make power measurements during this visit away from the Serving Frequency.
- The mobile station shall not change its time reference (see 2.1.5 of 3GPP2 C.S0002-A) until it resumes using the Serving Frequency Active Set, as described below.
- The mobile station shall tune to the Serving Frequency and resume using the Serving Frequency Active Set as follows:
  - If the mobile station was processing the Forward Fundamental Channel prior to tuning to the Candidate Frequency, the mobile station shall resume processing the Forward Fundamental Channel. If the mobile station was transmitting on the Reverse Fundamental Channel prior to tuning to the Candidate Frequency, the mobile station shall resume transmitting on the Reverse Fundamental Channel.
  - If the mobile station was processing the Forward Dedicated Control Channel prior to tuning to the Candidate Frequency, the mobile station shall resume processing the Forward Dedicated Control Channel. If the mobile station was transmitting on the Reverse Dedicated Control Channel prior to tuning to the Candidate Frequency, the mobile station shall resume transmitting on the Reverse Dedicated Control Channel.
  - If the Forward Supplemental Code Channels or Forward Supplemental Channels assignment has not expired, the mobile station shall resume processing the

Forward Supplemental Code Channels or Forward Supplemental Channels respectively (if any).

– If the Reverse Supplemental Code Channel or Reverse Supplemental Channels assignment has not expired, the mobile station may resume transmitting on the Reverse Supplemental Code Channels or Reverse Supplemental Channels respectively (if any).

– When the mobile station resumes transmission on the Reverse Traffic Channel, it shall use the following rules to re-enable its transmitter:

+ If the interval between the time that the mobile station disables its transmitter and the time that it resumes using the Serving Frequency Active Set is equal to or greater than ($N_{2m} \times 20$) ms, then the mobile station shall wait to receive a period of ($N_{3m} \times 20$) ms with sufficient signal quality (e.g. good frames) on the physical channel corresponding to $FPC\_PRI\_CHAN_S$ before it re-enables its transmitter.

+ Otherwise, the mobile station shall re-enable its transmitter no later than $N_{3m} \times 20$ ms after the mobile station tunes to the Serving Frequency. The mobile station should re-enable its transmitter earlier. After the mobile station re-enables its transmitter, the mean output power shall be as specified in 2.1.2.4.1 of 3GPP2 C.S0002-A for a step change in input power. If the mobile station re-enables its transmitter earlier than $N_{3m} \times 20$ ms after it tunes to the Serving Frequency, the initial mean output power shall be as specified in 2.1.2.3.1 of 3GPP2 C.S0002-A, where the initial mean input power estimate is either:

o within 6 dB of the actual mean input power, or

o equal to the mean input power before the mobile station tuned to the Target Frequency.

• The mobile station shall enable the fade timer and the handoff drop timers corresponding to the pilots in its Active Set and Candidate Set. The mobile station shall resume incrementing TOT_FRAMES_S and BAD_FRAMES_S as specified in 2.6.4.1.1.

• If Rate Set 2 is in use on the Reverse Traffic Channel, the mobile station shall set the erasure indicator bits as specified in 2.2.2.2 of 3GPP2 C.S0002-A.

6.3.3.2.1.2.4 Aborting GSM Channels Periodic Search

When the mobile station aborts a periodic search, it shall do the following:

• The mobile station shall cancel any remaining visits away from the Serving Frequency in the current search period and shall not send a *Candidate Frequency Search Report Message* for the current search period.

• The mobile station shall disable the periodic search timer.

• The mobile station may stop maintaining the average of the Serving Frequency received power that is used in the handoff and search procedures.

6.3.3.2.2 Base Station Procedures

6.3.3.2.2.1 Processing the MC-MAP GSM Handover Command Message

The base station shall send an *MC-MAP GSM Handover Command Message* to the mobile station to direct the mobile station from a MC-MAP system to a GSM system.

6.3.4 RR-level Registration

6.3.4.1 Forms of RR-level Registration

The MC-MAP system supports following different forms of RR-level registration:

1. Timer-based RR-registration. The mobile station registers when a timer expires.
2. Zone-based RR-registration. The mobile station registers when it enters a new zone.
3. Implicit RR-registration. When a mobile station successfully sends *an RRC Connection Request Message*, the base station can infer the mobile station's location. This is considered an implicit registration.
4. Traffic Channel RR-registration. Whenever the base station has registration information for a mobile station that has been assigned to a Traffic Channel, the base station can notify the mobile station that it is registered.

To support the above forms of RR-level registration during *Idle State*, *System Access State* and *Mobile Station Control on Traffic Channel State*, MC-MAP mobile station shall follow the corresponding requirements specified in 2.6.5 of 3GPP2 C.S0005-A with certain modifications.

6.3.4.1.1.1 Timer based RR-Registration

Timer based RR registration causes the mobile station to register at RR at regular intervals. The mobile station shall maintain a timer-based registration enable status ($TIMER\_REG_S$). The base station disables timer-based RR registration by setting to zero the RR_TMSI_EXP_PRD field of the *R-TMSI Assignment Message*.
The mobile station shall compute and store the timer expiration count ($RR\_REG\_COUNT\_MAX_S$) as

$$RR\_REG\_COUNT\_MAX_S = 2^{R\_TMSI\_EXP\_PRD / 4}.$$

The mobile station shall also maintain a timer-based RR registration counter ($RR\_REG\_COUNT_S$) that takes a pseudo random value between 0 and $RR\_REG\_COUNT\_MAX_S - 1$.
Timer-based RR registration counter $RR\_REG\_COUNT_S$ increments each time the Paging Channel or a Forward Common Control Channel slot counter (equivalent to a timer with time increments of 80 ms) increments. If $TIMER\_REG_S$ is equal to 'YES', and if the bits of $R\_TMSI\_CODE_S$ are not all equal to '1', the timer-based RR registration is performed when the counter reaches a value greater than equal to $RR\_REG\_COUNT\_MAX_S$ (that is controlled by the base station via the R_TMSI_EXP_PRD field of the *R-TMSI Assignment Message*).
The timer-based counter $RR\_REG\_COUNT_S$ is reset each time the mobile station receives the *R-TMSI Assignment Message* or the timer-based RR registration enable status $TIMER\_REG_S$ is changed from 'NO' to 'YES'. The mobile station shall set $RR\_REG\_COUNT_S$ to a pseudo random value between 0 and $RR\_REG\_COUNT\_MAX_S$ - 1, using the pseudo random number generator specified in 2.6.7.2 of 3GPP2 C.S0005-A.
The mobile station shall increment the counter $RR\_REG\_COUNT_S$ after each interval of 80 ms as specified in 2.6.5.1.3 of 3GPP2 C.S0005-A.

6.3.4.1.1.2 Zone-based RR-Registration

Each RR-registration zone is identified by the R-TMSI zone within a given network.

Zone-based RR Registration causes a mobile station to register at RR-level whenever it moves into a new R-TMSI zone, not on its internally stored list of visited zones. A zone is added to the list whenever an RR-registration is completed by the assignment of a new R-TMSI in the new R-TMSI zone, and is deleted upon the expiration of a timer.

A mobile station can be registered in more than one R-TMSI zone. The mobile station shall store a list of the zones in which the mobile station has registered (R_ZONE_LIST$_S$). Each entry in R_ZONE_LIST$_S$ shall include the R_TMSI_ZONE, R_TMSI_CODE, R_TMSI_COUNT, R_TMSI_COUNT_MAX and a zone list entry timer. The mobile station shall provide a means to increment R_TMSI_COUNT every 80 ms. The mobile station shall also provide a means to examine each timer's value while the timer is active, so that the age of the list entries can be compared. The zone entry timer is reset each time R_TMSI_COUNT is reassigned.

The base station controls the maximum number of zones in which the mobile station may be considered registered, by means of the TOT_R_TMSI_ZONES field of the *R-TMSI Assignment Message*, whenever a new R-TMSI is assigned in a new R-TMSI zone. Whenever an entry is added to the R_ZONE list, or if TOT_R_TMSI_ZONES$_S$ is decreased, the mobile station removes entries from the list if there are more entries than allowed by setting of the TOT_R_TMSI_ZONES$_S$.

Whenever R_ZONE_LIST$_S$ contains more than TOT_R_TMSI_ZONES$_S$ entries, the mobile station shall delete the excess entries according to the following rules:

- If TOT_R_TMSI_ZONES$_S$ is equal to zero, the mobile station shall delete all entries.
- If TOT_R_TMSI_ZONES$_S$ is not equal to zero, the mobile station shall delete those entries having active zone list entry timers, starting with the oldest entry, as determined by the timer values, and continuing in order of decreasing age until no more than TOT_R_TMSI_ZONES$_S$ entries remain.

6.3.4.1.2 RR-Registration Procedures

6.3.4.1.2.1 Actions in the *Mobile Station Initialization State*

If the mobile station enters the *Systems Determination Substate* with a power up indication, the mobile station shall perform the following actions:

- Delete all entries of R_ZONE_LIST$_S$.
- Set all the bits of R_TMSI_CODE$_S$ to '1'.
- Set RR_REG_ENABLED$_S$ to 'NO'.
- Set timer-based RR registration counter (TIMER_REG$_S$) to NO.

6.3.4.1.2.2 Actions in the *Mobile Station Idle State*

While in the *Mobile Station Idle State,* the mobile station shall perform RR registration procedures only if RR_REG_ENABLED$_S$ is set to '1'.

6.3.4.1.2.2.1 Idle RR Registration Procedures

The mobile station shall perform following actions in the order given below. If any action necessitates RR registration, the mobile station shall enter the *Update Overhead Information Substate* of the *System Access State* with RR-registration indication.

1. In *Response to Overhead Information Operation*, if R_TMSI_ZONE$_S$ is different from ASSIGNING_R_TMSI_ZONE$_S$ but R_TMSI_ZONE$_S$ is on one of the entries of R_ZONE_LIST$_S$, the mobile station shall set the ASSIGNING_R_TMSI_ZONE$_S$,

R_TMSI_CODE$_S$ and RR_REG_COUNT_MAX$_S$ and RR_REG_COUNT$_S$ to the corresponding values of the zone list entry.

2. If any R_ZONE_LIST entry time has expired (i.e., R_TMSI_COUNT has reached a value greater than or equal to the maximum value R_TMSI_COUNT_MAX), the mobile station shall delete the corresponding entry from the R_ZONE_LIST$_S$ if R_TMSI_ZONE entry of the list is not equal to ASSIGNING_R_TMSI_ZONE$_S$.

3. The mobile station shall perform timer-based RR registration if TIMER_REG$_S$ is equal to 'YES', and if RR_REG_ENABLED$_S$ is equal to 'YES', and if the stored configuration parameters are current (2.6.5.1.3 of 3GPP2 C.S0005-A), and if all the bits of R_TMSI_CODE$_S$ are not all equal to '1', and if RR_REG_COUNT$_S$ is greater than or equal to RR_REG_COUNT_MAX$_S$.

4. The mobile station shall perform zone-based RR registration if all of the following conditions are met:

   - TOT_R_TMSI_ZONES$_S$ is not equal to zero; and
   - The stored configuration parameters are current (2.6.2.2 of 3GPP2 C.S0005-A); and
   - RR_REG_ENABLED$_S$ is equal to YES; and
   - There is no entry of R_ZONE_LIST$_S$ whose R_TMSI_ZONE fields is not equal to stored R_TMSI_ZONE$_S$.

6.3.4.1.2.2.2 Mobile Station Message and Order Processing Operation

While in the *Mobile Station Idle State*, the mobile station may receive *R-TMSI Assignment Message*. The mobile stations shall process this message as specified in 6.3.4.1.2.5.

6.3.4.1.2.3 Actions in the *System Access State*

If the MC-MAP mobile station successfully sends *MC-MAP RRC Connection Request Message* or *RR-level Registration Message*, it shall set RR_REG_ENABLED$_S$ to 'YES'. If the mobile station doesn't receive the R-TMSI Assignment Message within time T75$_m$, it shall set all the bits of R_TMSI_CODE$_S$ to '1'.

If *R-TMSI Assignment Message* is received in time T75$_m$, it shall perform the procedures specified in 6.3.4.1.2.5.

If the mobile station declares an access attempt failure when in the *System Access State*, it shall set RR_REG_ENABLED$_S$ to 'NO', set all the bits of R_TMSI_CODE$_S$ to '1', and delete all the entries in R_ZONE_LIST$_S$.

6.3.4.1.2.4 Actions in the *Mobile Station Control on Traffic Channel State*

The mobile station shall perform following additional procedures while in different substates of the *Mobile Station Control on Traffic Channel State*.

6.3.4.1.2.4.1 Traffic Channel Initialization

Upon entering the *Traffic Channel Initialization Substate* of *the Mobile Station Control of Traffic Channel State*, the mobile station shall set TIMER_REG$_S$ to 'NO'.

6.3.4.1.2.4.2 Expiration Timer Maintenance

While in *the Mobile Station Control of Traffic Channel State*, the mobile station shall maintain all expiration timers. If any $R\_ZONE\_LIST_s$ entry time has expired, the mobile station shall remove the corresponding entry from the list.

If the $RR\_REG\_COUNT_s$ is greater than or equal to the value of $RR\_REG\_COUNT\_MAX_s$, the mobile station shall set all the bits of $R\_TMSI\_CODE_s$ to '1'.

6.3.4.1.2.4.3 Traffic Channel Substate

On receiving the R-TMSI Assignment Message, the mobile station shall perform the procedures specified in 6.3.4.1.2.5.

6.3.4.1.2.4.4 Release Substate

If all the bits of $R\_TMSI\_CODE_s$ are equal to '1', the mobile station shall set $RR\_REG\_ENABLED_s$ to 'NO'; otherwise it shall activate the timer based RR registration by setting $TIMER\_REG_s$ to 'YES'.

6.3.4.1.2.5 Processing of R-TMSI Assignment Message

On receiving *R-TMSI Assignment Message*, the mobile station shall store the following fields:

- If R_TMSI_INCL is equal to 1, the mobile station shall store the R-TMSI zone, code and expiration counters as follows:
  - The mobile station shall store the length of the R-TMSI zone field by setting $ASSIGNING\_R\_TMSI\_ZONE\_LEN_s$ to $R\_TMSI\_ZONE\_LEN_r$;
  - The mobile station shall store the assigning R-TMSI zone number by setting the $ASSIGNING\_R\_TMSI\_ZONE\_LEN_s$ least significant octets of $ASSIGNING\_R\_TMSI\_ZONE_s$ to $R\_TMSI\_ZONE_r$;
  - The mobile station shall store the R-TMSI code by setting $R\_TMSI\_CODE_s$ to $R\_TMSI\_CODE_r$.
  - The mobile station shall read the R_TMSI_EXP_PRD field. If all the bits of R_TMSI_EXP_PRD field are equal to '0', the mobile station shall set the $TIMER\_REG_s$ to 'NO'. If all the bits of R_TMSI_EXP_PRD field are not all equal to '0', the mobile station shall set $TIMER\_REG_s$ to 'YES" and shall set the $RR\_REG\_COUNT\_MAX_s$ as specified in 6.3.4.1.1.1. It shall then set the $RR\_REG\_COUNT_s$ as specified in 6.3.4.1.1.1.
- If R_TMSI_INCL is equal to 1, the mobile station shall also store the R-TMSI zone, code and counters as $R\_ZONE\_LIST_s$ entries and enable the entry timer.
- If R_TMSI_INCL is equal to 1, and if all bits of $R\_TMSI\_CODE_r$ are set to '1', the mobile station shall set '$RR\_REG\_ENABLED_s$' to 'NO'.
- If ZONE_INFO_INC is equal to '1', the mobile station shall perform the following actions:
  - The mobile station shall store $TOT\_R\_TMSI\_ZONES_s$ to $TOT\_R\_TMSI\_ZONES_r$.
  - If $R\_ZONE\_LIST_s$ contains more entries that $TOT\_R\_TMSI\_ZONES_s$, the mobile station shall delete excess entries according to the rules specified in 6.3.4.1.1.2.

– The mobile station shall read the R_PREV_ZONE_PRD field and set the following fields of the zone entry corresponding to the last R-TMSI zone it had registered as follows:

- The mobile station shall compute and set R_TMSI_COUNT_MAX as: $R\_TMSI\_COUNT\_MAX_S = 2^{R\_PREV\_ZONE\_PRD/4}$.
- The mobile station shall set $R\_TMSI\_COUNT_S$ to a pseudo random value between 0 and $R\_TMSI\_COUNT\_MAX_S - 1$, using the pseudo random number generator specified in 2.6.7.2 of 3GPP2 C.S0005-A.
- The mobile station shall reset the zone list entry timer.

6.4 MC-MAP RRC Messages, Orders, and Information Records

Tables 6.4-1, 6.4-2, 6.4-3, and 6.4-4 below list all the messages used in 3GPP2 C.S0005-A, and state their disposition in the MC-MAP standard. These tables also list the new messages defined for the MC-MAP standard.

Table 6.4-1. r-csch Messages

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
Registration Message	RGM	C.S0005-A 2.7.1.3.2.1	Not used.
Order Message	ORDM	C.S0005-A 2.7.1.3.2.2	Used, with restrictions (see Table 6.4.3-1).
Data Burst Message	DBM	C.S0005-A 2.7.1.3.2.3	Used, as is.
Origination Message	ORM	C.S0005-A 2.7.1.3.2.4	Not used.
Page Response Message	PRM	C.S0005-A 2.7.1.3.2.5	Not used.
Authentication Challenge Response Message	AUCRM	C.S0005-A 2.7.1.3.2.6	Not used.
Status Response Message	STRPM	C.S0005-A 2.7.1.3.2.7	Not used.
TMSI Assignment Completion Message	TACM	C.S0005-A 2.7.1.3.2.8	Not used.
PACA Cancel Message	PACNM	C.S0005-A 2.7.1.3.2.9	Not used.
Extended Status Response Message	ESTRPM	C.S0005-A 2.7.1.3.2.10	Used, with restrictions (see Table 6.4.4-1).
Flash With Information Message	FWIM	C.S0005-A 2.7.1.3.2.11	Not used.
Security Mode Request Message	SMRM	C.S0005-A 2.7.1.3.2.14	Used, as is.
RR-level Registration Message	RRLRM	6.4.1.3.1	New MC-MAP message
MC-MAP Initial L3 Message	MAPIL3M	6.4.1.3.2	New MC-MAP message
MC-MAP L3 Message	MAPL3M	6.4.1.3.3	New MC-MAP message
MC-MAP RRC Connection Request Message	MAPCRM	6.4.1.3.4	New MC-MAP message
R-TMSI Assignment Completion Message	RTACM	6.4.1.3.5	New MC-MAP message

1 Table 6.4-2. r-dsch Messages (Part 1 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
Order Message	ORDM	C.S0005-A 2.7.2.3.2.1	Used, with restrictions (see Table 6.4.3-1).
Authentication Challenge Response Message	AUCRM	C.S0005-A 2.7.2.3.2.2	Not used.
Flash With Information Message	FWIM	C.S0005-A 2.7.2.3.2.3	Not used.
Data Burst Message	DBM	C.S0005-A 2.7.2.3.2.4	Used, as is.
Pilot Strength Measurement Message	PSMM	C.S0005-A 2.7.2.3.2.5	Used, as is.
Power Measurement Report Message	PMRM	C.S0005-A 2.7.2.3.2.6	Used, as is.
Send Burst DTMF Message	BDTMFM	C.S0005-A 2.7.2.3.2.7	Not used.
Status Message	STM	C.S0005-A 2.7.2.3.2.8	Not Used.
Origination Continuation Message	ORCM	C.S0005-A 2.7.2.3.2.9	Not used.
Handoff Completion Message	HOCM	C.S0005-A 2.7.2.3.2.10	Used, as is.
Parameters Response Message	PRSM	C.S0005-A 2.7.2.3.2.11	Used as is.
Service Request Message	SRQM	C.S0005-A 2.7.2.3.2.12	Used, as is.
Service Response Message	SRPM	C.S0005-A 2.7.2.3.2.13	Used, as is.
Service Connect Completion Message	SCCM	C.S0005-A 2.7.2.3.2.14	Used, as is.
Service Option Control Message	SOCM	C.S0005-A 2.7.2.3.2.15	Used, as is.
Status Response Message	STRPM	C.S0005-A 2.7.2.3.2.16	Used, with restrictions (see Table 6.4.4-1).
TMSI Assignment Completion Message	TACM	C.S0005-A 2.7.2.3.2.17	Not used.
Supplemental Channel Request Message	SCRM	C.S0005-A 2.7.2.3.2.18	Used, as is.
Candidate Frequency Search Response Message	CFSRSM	C.S0005-A 2.7.2.3.2.19	Used, as is
Candidate Frequency Search Report Message	CFSRPM	C.S0005-A 2.7.2.3.2.20	Used, with modifications (see 6.4.2.4.1)
Periodic Pilot Strength Measurement Message	PPSMM	C.S0005-A 2.7.2.3.2.21	Used, as is.

1 Table 6.4-2. r-dsch Messages (Part 2 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
Outer Loop Report Message	OLRM	C.S0005-A 2.7.2.3.2.22	Used, as is.
Resource Request Message	RRM	C.S0005-A 2.7.2.3.2.23	Used, as is.
Extended Release Response Message	ERRM	C.S0005-A 2.7.2.3.2.25	Used, as is.
Extended Release Response Mini Message	ERRMM	C.S0005-A 2.7.2.3.2.26	Used, as is.
Pilot Strength Measurement Mini Message	PSMMM	C.S0005-A 2.7.2.3.2.27	Used, as is.
Supplemental Channel Request Mini Message	SCRMM	C.S0005-A 2.7.2.3.2.28	Used, as is.
Enhanced Origination Message	EOM	C.S0005-A 2.7.2.3.2.29	Not Used.
Extended Flash With Information Message	EFWIM	C.S0005-A 2.7.2.3.2.30	Not Used.
Extended Pilot Strength Measurement Message	EPSMM	C.S0005-A 2.7.2.3.2.31	Used, as is.
Extended Handoff Completion Message	EHOCM	C.S0005-A 2.7.2.3.2.32	Used, as is.
Mobile Station Resource Release Request Message	MSRRRM	C.S0005-A 2.7.2.3.2.33	Used, as is.
Mobile Station Resource Release Request Mini Message	MSRRRMM	C.S0005-A 2.7.2.3.2.34	Used, as is.
Security Mode Request Message	SMRM	C.S0005-A 2.7.2.3.2.37	Used, as is
MC-MAP Initial L3 Message	MAPIL3M	6.4.1.4.1	New MC-MAP message.
MC-MAP L3 Message	MAPL3M	6.4.1.4.2	New MC-MAP message.
R-TMSI Assignment Completion Message	RTACM	6.4.1.4.3	New MC-MAP message.

1 Table 6.4-3. f-csch Messages (Part 1 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
System Parameters Message	SPM	C.S0005-A 3.7.2.3.2.1	Used, with modifications (see 6.4.2.1.1).
Access Parameters Message	APM	C.S0005-A 3.7.2.3.2.2	Used, with modifications (see 6.4.2.1.2).
Neighbor List Message (Band Class 0 only)	NLM	C.S0005-A 3.7.2.3.2.3	Used, as is.
CDMA Channel List Message	CCLM	C.S0005-A 3.7.2.3.2.4	Used, as is.
Order Message	ORDM	C.S0005-A 3.7.2.3.2.7	Used, with restrictions (see Table 6.4.3-2).
Channel Assignment Message	CAM	C.S0005-A 3.7.2.3.2.8	Not used.
Data Burst Message	DBM	C.S0005-A 3.7.2.3.2.9	Used, as is.
Authentication Challenge Message	AUCM	C.S0005-A 3.7.2.3.2.10	Not used.
SSD Update Message	SSDUM	C.S0005-A 3.7.2.3.2.11	Not used.
Feature Notification Message	FNM	C.S0005-A 3.7.2.3.2.12	Not Used.
Extended System Parameters Message	ESPM	C.S0005-A 3.7.2.3.2.13	Used, with modifications (see 6.4.2.1.3).
Extended Neighbor List Message (Band Class 1 only)	ENLM	C.S0005-A 3.7.2.3.2.14	Used, as is.
Status Request Message	STRQM	C.S0005-A 3.7.2.3.2.15	Used, with restrictions, (see Table 6.4.4-2).
Service Redirection Message	SRDM	C.S0005-A 3.7.2.3.2.16	Used, with modifications (see 6.4.2.1.4).
General Page Message	GPM	C.S0005-A 3.7.2.3.2.17	Used, with modifications (see 6.4.2.1.5).
Global Service Redirection Message	GSRDM	C.S0005-A 3.7.2.3.2.18	Used, with modifications (see 6.4.2.1.6).
TMSI Assignment Message	TASM	C.S0005-A 3.7.2.3.2.19	Not used.

1 Table 6.4-3. f-csch Messages (Part 2 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
PACA Message	PACAM	C.S0005-A 3.7.2.3.2.20	Not used.
Extended Channel Assignment Message	ECAM	C.S0005-A 3.7.2.3.2.21	Used, with modifications (see 6.4.2.1.7).
General Neighbor List Message	GNLM	C.S0005-A 3.7.2.3.2.22	Used, as is.
User Zone Identification Message	UZIM	C.S0005-A 3.7.2.3.2.23	Used, as is.
Private Neighbor List Message	PNLM	C.S0005-A 3.7.2.3.2.24	Used, as is.
Sync Channel Message	SCHM	C.S0005-A 3.7.2.3.2.25	Used, with modifications (see 6.4.2.1.8).
Extended Global Service Redirection Message	EGSRM	C.S0005-A 3.7.2.3.2.26	Used, with modifications (see 6.4.2.1.9).
Extended CDMA Channel List Message	ECCLM	C.S0005-A 3.7.2.3.2.27	Used, as is.
ANSI-41 System Parameters Message	A41SPM	C.S0005-A 3.7.2.3.2.28	Not used.
MC-RR Parameters Message	MCRRPM	C.S0005-A 3.7.2.3.2.29	Used, with modification (see 6.4.2.1.12)
ANSI-41 RAND Message	A41RANDM	C.S0005-A 3.7.2.3.2.30	Not used.
Enhanced Access Parameters Message	EAPM	C.S0005-A 3.7.2.3.2.31	Used, with modifications (see 6.4.2.1.10).
Universal Neighbor List Message	UNLM	C.S0005-A 3.7.2.3.2.32	Used, as is.
Security Mode Command Message	SMCM	C.S0005-A 3.7.2.3.2.33	Used, with modifications (see 6.4.2.1.11)
MC-MAP Sync Channel Message	MAPSCHM	6.4.1.1.1	New MC-MAP message.
MC-MAP System Information Message	MAPSIM	6.4.1.1.2	New MC-MAP message.
MC-MAP L3 Message	MAPL3M	6.4.1.1.3	New MC-MAP message.
R-TMSI Assignment Message	RTASM	6.4.1.2.4	New MC-MAP message.

1 Table 6.4-4. f-dsch Messages (Part 1 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
Order Message	ORDRM	C.S0005-A 3.7.3.3.2.1	Used, with restrictions (see Table 6.4.3-2).
Authentication Challenge Message	AUCM	C.S0005-A 3.7.3.3.2.2	Not used.
Alert With Information Message	AWIM	C.S0005-A 3.7.3.3.2.3	Not used.
Data Burst Message	DBM	C.S0005-A 3.7.3.3.2.4	Used, as is.
Analog Handoff Direction Message	AHDM	C.S0005-A 3.7.3.3.2.6	Not used.
In-Traffic System Parameters Message	ITSPM	C.S0005-A 3.7.3.3.2.7	Used, with modifications (see 6.4.2.2.1).
Neighbor List Update Message	NLUM	C.S0005-A 3.7.3.3.2.8	Used, as it is.
Send Burst DTMF Message	BDTMFM	C.S0005-A 3.7.3.3.2.9	Not used.
Power Control Parameters Message	PCNPM	C.S0005-A 3.7.3.3.2.10	Used, as is.
Retrieve Parameters Message	RTPM	C.S0005-A 3.7.3.3.2.11	Used, as is.
Set Parameters Message	STPM	C.S0005-A 3.7.3.3.2.12	Used, as is.
SSD Update Message	SSDUM	C.S0005-A 3.7.3.3.2.13	Not used.
Flash With Information Message	FWIM	C.S0005-A 3.7.3.3.2.14	Not used.
Mobile Station Registered Message	MSRM	C.S0005-A 3.7.3.3.2.15	Not used.
Status Request Message	STRQM	C.S0005-A 3.7.3.3.2.16	Used, with restrictions (see Table 6.4.4-2).
Extended Handoff Direction Message	EHDM	C.S0005-A 3.7.3.3.2.17	Used, as is.
Service Request Message	SRQM	C.S0005-A 3.7.3.3.2.18	Used, as is.
Service Response Message	SRPM	C.S0005-A 3.7.3.3.2.19	Used, as is.
Service Connect Message	SCM	C.S0005-A 3.7.3.3.2.20	Used, as is.
Service Option Control Message	SOCM	C.S0005-A 3.7.3.3.2.21	Used, as is.
TMSI Assignment Message	TASM	C.S0005-A 3.7.3.3.2.22	Not used.

Service Redirection Message	SRDM	C.S0005-A 3.7.3.3.2.23	Used, with modifications (see 6.4.2.2.2).
Supplemental Channel Assignment Message	SCAM	C.S0005-A 3.7.3.3.2.24	Used, as is.
Power Control Message	PCNM	C.S0005-A 3.7.3.3.2.25	Used, as is.

1 Table 6.4-4. f-dsch Messages (Part 2 of 2)

Message Name	MSG_TAG	Section Number	Disposition in MC-MAP
Extended Neighbor List Update Message	ENLUM	C.S0005-A 3.7.3.3.2.26	Used, as is.
Candidate Frequency Search Request Message	CFSRQM	C.S0005-A 3.7.3.3.2.27	Used, with modification (see 6.4.2.2.5)
Candidate Frequency Search Control Message	CFSCNM	C.S0005-A 3.7.3.3.2.28	Used, as is
Power Up Function Message	PUFM	C.S0005-A 3.7.3.3.2.29	Used, as is.
Power Up Function Completion Message	PUFCM	C.S0005-A 3.7.3.3.2.30	Used, as is.
General Handoff Direction Message	GHDM	C.S0005-A 3.7.3.3.2.31	Used, with modifications (see 6.4.2.2.3).
Resource Allocation Message	RAM	C.S0005-A 3.7.3.3.2.32	Used, as is.
Resource Allocation Mini Message	RAMM	C.S0005-A 3.7.3.3.2.33	Used, as is.
Extended Release Message	ERM	C.S0005-A 3.7.3.3.2.34	Used, as is.
Extended Release Mini Message	ERMM	C.S0005-A 3.7.3.3.2.35	Used, as is.
Universal Handoff Direction Message	UHDM	C.S0005-A 3.7.3.3.2.36	Used, with modifications (see 6.4.2.2.4).
Extended Supplemental Channel Assignment Message	ESCAM	C.S0005-A 3.7.3.3.2.37	Used, as is.
Forward Supplemental Channel Assignment Mini Message	FSCAMM	C.S0005-A 3.7.3.3.2.38	Used, as is.
Reverse Supplemental Channel Assignment Mini Message	RSCAMM	C.S0005-A 3.7.3.3.2.39	Used, as is.
Mobile Assisted Burst Operation Parameters Message	MABOPM	C.S0005-A 3.7.3.3.2.40	Used, as is.
Call Assignment Message	CLAM	C.S0005-A 3.7.3.3.2.41	Not used.
Extended Alert With Information Message	EAWIM	C.S0005-A 3.7.3.3.2.42	Not used.
Extended Flash With Information Message	EFWIM	C.S0005-A 3.7.3.3.2.42	Not Used.
Security Mode Command Message	SMCM	C.S0005-A 3.7.3.3.2.42	Used, with modification (see 6.4.2.2.6)
MC-MAP L3 Message	MAPL3M	6.4.1.2.1	New MC-MAP message.
MC-MAP GSM Handover Command Message	MAPGHCM	6.4.1.2.2	New MC-MAP message.
R-TMSI Assignment Message	RTASM	6.4.1.2.3	New MC-MAP message.

MC-MAP Dedicated Mode Paging Message	MAPDMPM	6.4.1.2.4	New MC-MAP message.

6.4.1 New Messages

This section lists new MC-MAP messages; hence, underlining of text is implied.

6.4.1.1 f-csch

6.4.1.1.1 MC-MAP Sync Channel Message

MSG_TAG: MAPSCHM

Field	Length (bits)
NUM_ID_RECORDS	3

NUM_ID_RECORDS occurrences of the following record:

CN_ID_TYPE	3
CN_ID_LEN	4
CN_ID_FIELDS	8 × CN_ID_LEN

Followed by the field:

MC_PARAMS	1
DIF_FREQ_PARAMS	1

If MC_PARAMS=1, there shall be following additional fields:

PILOT_PN	9
LC_STATE	42
SYS_TIME	36
LP_SEC	8
LTM_OFF	6
DAYLT	1

1 If DIF_FREQ_PARAMS = ‘1’, there shall be following additional fields:

P_REV_LEVEL	8
MIN_P_REV_LEVEL	8
PRAT	2
CDMA_FREQ	11
EXT_CDMA_FREQ	11
SR1_BCCH_SUPPORTED	1
SR1 NON_TD_FREQ_INCL	0 or 1
SR1_CDMA_FREQ_NON_TD	0 or 11
SR1_BRAT_NON_TD	0 or 2
SR1_TD_INCL	0 or 1
SR1_CDMA_FREQ_TD	0 or 11
SR1_BRAT_TD	0 or 2
SR1_TD_MODE	0 or 2
SR1_TD_POWER_LEVEL	0 or 2
SR3_SUPPORTED	1
SR3_CENTER_FREQ_INCL	0 or 1
SR3_CENTER_FREQ	0 or 11
SR3_BRAT	0 or 2
SR3_PRIMARY_PILOT	0 or 2
SR3_PILOT_POWER1	0 or 3
SR3_PILOT_POWER2	0 or 3

2 If CN_ID_TYPE = ‘001’, the CN_ID_FIELDS shall be:

MCC_1	4
MCC_2	4
MCC_3	4
MNC_1	4
MNC_2	4
MNC_3	4

3

NUM_ID_RECORDS	Number of Identification records.
	The base station shall set this field to the number of different identification types network may have. Each type is then specified in the record that follows.
CN_ID_TYPE.	Core Network Identification Type.
	The base station shall set this field to specify the type of network identification.
CN_ID_LEN	Core Network Identification length.
	The base station shall set this field to the number of octets in the CN_ID_FIELDS included in this identification record.
CN_ID_FIELDS	Core Network Identification fields.
	The identification record fields are determined by the value of CN_ID_TYPE, as described below.

If the CN_ID_TYPE field is set to ‘001’, the base station shall include the following fields, specifying GSM Location Area Identification:

MCC_1	BCD coded first digit of the Mobile Country Code (MCC).
MCC_2	BCD coded second digit of the MCC.
MCC_3	BCD coded third digit of the MCC.
	The MCC field is coded as in CCITT Rec.E212, Annex A.
MNC_1	BCD coded first digit of the Mobile Network code (MNC).
MNC_2	BCD coded second digit of the MNC.
	The coding of MNC field is the responsibility of the administration.
MNC_3	BCD coded third digit of the MNC.
	For the network IDs having two digit MNC, the third digit shall be coded as ‘1111’.
MC_PARAMS	One-bit field to denote whether CDMA MC specific parameters follow.
	The base station shall set this field to ‘0’ if CDMA MC specific parameters are sent in *Sync Channel Message* (see 3.7.2.3.2.26 of 3GPP2 C.S0005-A); otherwise it shall set this field to ‘1’.
	The CDMA MC specific parameters are specified in *Sync Channel Message* in 3.7.2.3.2.26 of 3GPP2 C.S0005-A.
	If the *Sync Channel Message* is not being sent on the f-csch (Sync Channel), the base station shall set MC_PARAMS to ‘1’. If the *Sync Channel Message* is being sent, the base station

1 should not set MC_PARAMS to ‘1’.

DIF_FREQ_PARAMS — One bit field the base station shall use to direct the MS to operate on different frequency if MC_PARAMS = '0' (i.e., if CDMA MC specific parameters are also sent in *Sync Channel Message*).

If MC_PARAMS = '0', the base station shall set DIF_FREQ_PARAMS to '1', if it supports different frequency channels for MC-MAP operation. The base station shall then include the frequency related fields as specified (see 3.7.2.3.2.26 of 3GPP2 C.S0005-A for definition); otherwise it shall set DIF_FREQ_PARAMS to '0'.

If MC_PARAMS = '1', the base station shall set DIF_FREQ_PARAMS to '1'. The frequency related fields are always included.

6.4.1.1.2 MC-MAP System Information Message

MSG_TAG: MAPSIM

Field	Length (bits)
PILOT_PN	9
CONFIG_MSG_SEQ	6
NUM_INFO_RECORDS	3

NUM_INFO_RECORDS occurrences of the following record:

CN_INFO_TYPE	3
CN_INFO_LEN	6
CN_INFO_FIELDS	8 × CN_INFO_LEN

Followed by the field:

MC_PARAMS	1

PILOT_PN — Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

CONFIG_MSG_SEQ — Configuration message sequence number.

The base station shall set this field to CONFIG_SEQ (see 3.6.2.2 of 3GPP2 C.S0005-A).

NUM_INFO_RECORDS — Number of Information records.

The base station shall set this field to the number of

different information records. Each type is then specified in the record that follows.

CN_INFO_TYPE — Core Network Information Type.

The network shall set this field to specify the type of network identification.

CN_INFO_LEN — Core Network Information length.

The network shall set this field to the number of octets in the CN_INFO_FIELDS included in this information record.

CN_INFO_FIELDS — Network Information fields.

The identification record fields are determined by the value of CN_INFO_TYPE, as described below. If the CN_ID_TYPE field is set to '001', the base station shall include the following fields:

LAI — Location Area Identification.

The coding of the LAI field is the responsibility of the administration. LAI fields are encoded as under:

8	7	6	5	4	3	2	1	
								Octet 1
MNC digit 3								Octet 2
MNC digit 2				MNC digit 1				Octet 3
LAC								Octet 4
LAC (continued)								Octet 5

MNC — Mobile Network Code.

Mobile Network code digits (refer to GSM 03.03) and LAC are Location Area Code digits. For the network IDs having two-digit MNC, the third digit shall be coded as '1111'.

CELL_ID — Cell Identity.

The purpose of the Cell Identity is to identify a cell within a location area. The coding of the Cell Identity is the responsibility of each administration.

GEN_SYS_IND — General System Indicators.

This includes several general indicators and flags specifying the current functionality of the system, and how the mobile stations shall behave while operating in the system. This field is encoded as:

8	7	6	5	4	3	2	1
BAR	RE	Reserved	ATT	Reserved	000 spare		

BAR — Cell Barred Access indicator.

This field indicates if the cell is barred for access. If the BAR field is set to '0', the cell is not barred. If the BAR field is set to '1', then the cell is barred.

RE	Call Reestablishment Allowed indicator. This field indicates whether call reestablishment is allowed in the cell. If the RE field is set to '0', then call reestablishment is allowed in the cell. If the RE field is set to '1', then call reestablishment is not allowed in the cell.
ATT	IMSI Attach/Detach Indicator. The base station shall set this field to '0' if mobile stations in the cell are not allowed to apply IMSI attach and detach procedure. The base station shall set this field to '1' if mobile stations in the cell shall apply IMSI attach and detach procedure.
PER_LOC_UP_TIMER	Periodic Location Update Timer (GSM T3212). This field is coded as the binary representation of the timeout value for periodic updating in decihours. The value 0 is used for infinite timeout value, i.e., periodic updating shall not be used within the cell.
MC_PARAMS	MC parameters message indicator. One-bit field that tells mobile station which message includes the CDMA MC specific RRC fields. When this message is sent on Forward Common Control Channel, MC_PARAMS shall be set to '1'. Base station shall send the CDMA MC specific fields in *MC-RR Parameters Message* (see 3.7.2.3.2.30 of 3GPP2 C.S0005-A). When this message is sent on Paging Channel, the base station shall set this bit as follows: If *Systems Parameter Message* is transmitted, base station shall set MC_PARAMS to '0'. CDMA MC specific fields can be read from *Systems Parameter Message* (see 3.7.2.3.2.1 of 3GPP2 C.S0005-A) and *Extended Systems Parameter Message* (see 3.7.2.3.2.13 of 3GPP2 C.S0005-A). If *Systems Parameter Message* is not transmitted, base station shall set MC_PARAMS to '1'. Base station shall send the CDMA MC specific fields in *MC-RR Parameters Message* (see 3.7.2.3.2.30 of 3GPP2 C.S0005-A).

6.4.1.1.3 MC-MAP L3 Message

MSG_TAG: MAPL3M

Field	Length (bits)
CN_DOMAIN_ID	2
NAS_INFO_LEN	12
NAS_INFO_DATA	8 × NAS_INFO_LEN

CN_DOMAIN_ID Core Network Domain Identifier.

The base station shall set CN_DOMAIN_ID field to the appropriate value as shown in Table 6.4.1.1.3-1.

Table 6.4.1.1.3-1. CN_DOMAIN_ID values

CN_DOMAIN_ID (binary)	Core network domain identifier
00	PSTN/ISDN
01	IP
11	Don't Care
All other values are reserved	

NAS_INFO_LEN Non Access Stratum Information Length.

The base station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this message.

NAS_INFO_DATA Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the base station.

6.4.1.1.4 R-TMSI Assignment Message

MSG_TAG: RTASM

Field	Length (bits)
R_TMSI_INCL	1
R_TMSI_ZONE_LEN	0 or 4
R_TMSI_ZONE	8 × R_TMSI_ZONE_LEN
R_TMSI_CODE	0 or 32
R_TMSI_EXP_PRD	0 or 7
ZONE_INFO_INCL	0 or 1
TOT_R_TMSI_ZONES	0 or 3
R_PREV_ZONE_PRD	0 or 7

R_TMSI_INCL — One bit flag to denote whether Radio TMSI is included or not.

The base station shall set this field to '1' if it wants to assign new R-TMSI to the mobile station; otherwise it shall set the field to '0'.

If R_TMSI_INCL is set to '1', the base station shall include the following fields:

R_TMSI_ZONE_LEN — Radio TMSI zone length.

The base station shall set this field to the number of octets included in the R_TMSI_ZONE. The base station shall set this field to a value in the range 1 to 8 inclusive.

R_TMSI_ZONE — Radio TMSI zone.

The base station shall set this field to the Radio TMSI zone number.

R_TMSI_CODE — Radio temporary mobile station identity code.

The base station shall set this field to the 32-bit Radio TMSI code assigned to the mobile station.

If the base station is to deassign the Radio TMSI, the base station shall set all the bits in this field to '1'.

R_TMSI_EXP_PRD	Radio TMSI expiration period. If mobile station is not to perform timer-based RR registration, the base station shall set this field to '0000000'. If mobile station is to perform timer-based RR registration, the base station shall set this field to the value in the range 28 to 85 inclusive, such that the desired timer value is $\lfloor 2^{REG\_PRD/4} \rfloor \times 0.08$ seconds.
ZONE_INFO_INCL	One-bit flag to indicate if the information for maintenance of $R\_ZONE\_LIST_S$ is included or not. The base station shall set this field to '1' if the mobile station is registering in a new zone and shall include the following fields; otherwise it shall set this field to '0'.
TOT_R_TMSI_ZONES	Number of R-TMSI zones to be retained. The base station shall set this field to the number of R-TMSI zones the mobile station is to retain for purposes of zone-based RR-level registration (see 2.6.5.1.5). If zone-based RR-level registration is to be disabled, the base station shall set this field to '000'.
R_PREV_ZONE_PRD	R-TMSI previous zone expiration. The base station shall set this field to the value in the range 24 to 85 inclusive, such that the desired timer value for expiration of previous zone R-TMSI is $\lfloor 2^{REG\_PRD/4} \rfloor \times 0.08$ seconds.

6.4.1.2 f-dsch

6.4.1.2.1 MC-MAP L3 Message
MSG_TAG: MAPL3M

Field	Length (bits)
CN_DOMAIN_ID	2
NAS_INFO_LEN	12
NAS_INFO_DATA	8 × NAS_INFO_LEN

CN_DOMAIN_ID — Core Network Domain Identifier.

The base station shall set CN_DOMAIN_ID field to the appropriate value as shown in Table 6.4.1.1.3-1.

NAS_INFO_LEN — Non Access Stratum Information Length.

The base station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this message.

NAS_INFO_DATA — Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the base station.

6.4.1.2.2 MC-MAP GSM Handover Command Message
MSG_TAG: MAPGHCM

Field	Length (bits)
USE_TIME	1
ACTION_TIME	0 or 6
GSM_T_REF_INCL	1
CDMA_TIME	0 or 6
GSM_FRAME	0 or 19
GSM_FRAME_FRACT	0 or 9
GSM_INFO_LEN	12
GSM_INFO_DATA	8 × GSM_INFO_LEN

USE_TIME — Use action time indicator.

This field indicates whether an explicit action time is

		specified in this message. If an explicit action time is specified in this message, the base station shall set this field to '1'; otherwise, the base station shall set this field to '0'.
	ACTION_TIME	Action time.
		If the USE_TIME field is set to '1', the base station shall set this field to the System Time, in units of 80 ms (modulo 64), at which the handover is to take effect. If the USE_TIME field is set to '0' the base station shall omit this field.
	GSM_T_REF_INCL	GSM Time Reference Included.
		This field indicates whether a GSM Time Reference is included in this message. If GSM Time Reference is specified in this message, the base station shall set this field to '1'; otherwise, the base station shall set this field to '0'.
	CDMA_TIME-	CDMA Time.
		If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the CDMA System Time, in units of 80 ms (modulo 64), to which the GSM_FRAME is referred. If the USE_TIME field is set to '0' the base station shall omit this field.
	GSM_FRAME-	GSM Frame number.
		If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the GSM frame number valid at the time specified by CDMA_TIME in the GSM target base station, as specified in Section 3.3.2.2 of GSM 05.02. If the GSM_T_REF_INCL field is set to '0' the base station shall omit this field.
	GSM_FRAME_FRACT	GSM Frame Fraction.
		If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the number of $1/2^9$ fractions of a GSM frame valid at the time specified by CDMA_TIME in the GSM target base station, with range 0 to (2^9-1). The GSM frame duration is specified in Section 4.3.1 of GSM 05.02 as 24/5200 s. If the GSM_T_REF_INCL field is set to '0', the base station shall omit this field.

GSM_INFO_LEN — GSM Information Length.

The base station shall set this field to the number of octets in the GSM_INFO_DATA fields included in this message.

GSM_INFO_DATA — GSM Information Data.

The base station shall set this field as the information elements included in the Handover Command, as specified in Section 9.1.15 of GSM 04.08 (FFS).

6.4.1.2.3 R-TMSI Assignment Message
MSG_TAG: RTASM

Field	Length (bits)
R_TMSI_INCL	1
R_TMSI_ZONE_LEN	0 or 4
R_TMSI_ZONE	8 × R_TMSI_ZONE_LEN
R_TMSI_CODE	0 or 32
R_TMSI_EXP_PRD	0 or 7
ZONE_INFO_INCL	0 or 1
TOT_R_TMSI_ZONES	0 or 3
R_PREV_ZONE_PRD	0 or 7

R_TMSI_INCL — One bit flag to denote whether Radio TMSI is included or not.

The base station shall set this field to '1' if it wants to assign new R-TMSI to the mobile station; otherwise it shall set the field to '0'.

If R_TMSI_INCL is set to '1', the base station shall include the following fields:

R_TMSI_ZONE_LEN — Radio TMSI zone length.

The base station shall set this field to the number of octets included in the R_TMSI_ZONE. The base station shall set this field to a value in the range 1 to 8 inclusive.

R_TMSI_ZONE — Radio TMSI zone.

		The base station shall set this field to the Radio TMSI zone number.
	R_TMSI_CODE	Radio temporary mobile station identity code.
		The base station shall set this field to the 32-bit Radio TMSI code assigned to the mobile station. If the base station is to deassign the Radio TMSI, the base station shall set all the bits in this field to '1'.
	R_TMSI_EXP_PRD	Radio TMSI expiration time.
		If mobile station is not to perform timer-based RR registration, the base station shall set this field to '0000000'. If mobile station is to perform timer-based RR registration, the base station shall set this field to the value in the range 28 to 85 inclusive, such that the desired timer value is $\lfloor 2^{REG\_PRD/4} \rfloor \times 0.08$ seconds.
	ZONE_INFO_INCL	One bit flag to indicate if the information for maintenance of $R\_ZONE\_LIST_s$ is included or not.
		The base station shall set this field to '1' if the mobile station is registering in a new zone and include the following fields; otherwise it shall set this field to '0'.
	TOT_R_TMSI_ZONES	Number of R-TMSI zones to be retained.
		The base station shall set this field to the number of R-TMSI zones the mobile station is to retain for purposes of zone-based RR-level registration (see 2.6.5.1.5).
		If zone-based RR-level registration is to be disabled, the base station shall set this field to '000'.
	R_PREV_ZONE_PRD	R-TMSI previous zone expiration.
		The base station shall set this field to the value in the range 24 to 85 inclusive, such that the desired timer value for expiration of previous zone R-TMSI is $\lfloor 2^{REG\_PRD/4} \rfloor \times 0.08$ seconds.

6.4.1.2.4 MC-MAP Dedicated Mode Paging Message
MSG_TAG: MAPDMPM

Field	Length (bits)
CN_DOMAIN_ID	2
SERVICE_OPTION	16
PAGE_REC_TYPE_ID	4

CN_DOMAIN_ID — Core Network Domain Identifier.

The base station shall set this field to the appropriate value as shown in Table 6.4.1.1.3-1.

SERVICE_OPTION — Service Option Number.

The base station shall set this field to the appropriate value of the service option number corresponding to the “paging cause” received from the Upper Layers.

PAGE_REC_TYPE_ID — Paging Record Type Identifier.

The base station shall set this field to the appropriate value of the paging record type identifier as shown in Table 6.4.1.2.4-1.

Table 6.4.1.2.4-1. PAGING_REC_TYPE_ID values

PAGING_REC_TYPE_ID (binary)	Paging Record Type Identifier
0000	IMSI
0001	TMSI
0010	P-TMSI
All other values are reserved	

6.4.1.3 r-csch

6.4.1.3.1 RR-level Registration Message
MSG_TAG: RRLRM

Field	Length (bits)
RR_REG_TYPE	4
SLOT_CYCLE_INDEX	3
MOB_P_REV	8
KEY_SEQ_NEW	0 or 4

RR_REG_TYPE — Registration type.

This field indicates which type of event generated the RR-level registration attempt.

The mobile station shall set this field to the REG_TYPE value shown in Table 6.4.1.3.1-1 corresponding to the event that caused this registration to occur.

SLOT_CYCLE_INDEX — Preferred slot cycle index.

If the mobile station is configured for slotted mode operation, the mobile station shall set this field to the preferred slot cycle index, SLOT_CYCLE_INDEXp (see 2.6.2.1.1 of 3GPP2 C.S0005-A). Otherwise, the mobile station shall set this field to '000'.

MOB_P_REV — Protocol revision of the mobile station.

KEY_SEQ_NEW — New key sequence number.

The key sequence number corresponding to the new encryption key generated by the mobile station.

The mobile station shall set this field to $KEY\_SEQ\_NEW_{s\text{-}p}$, the sequence number associated with the new encryption key generated by the mobile station.

Table 6.4.1.3.1-1. RR_Registration Type (RR_REG_TYPE) Codes

RR_REG_TYPE (binary)	Type of RR Registration
0000	Timer-based
0001	Zone-based
0010	Page response
0011	Channel needed
All other RR_REG_TYPE values are reserved.	

6.4.1.3.2 MC-MAP Initial L3 Message

MSG_TAG: MAPIL3M

Field	Length (bits)
CN_DOMAIN_ID	2
SERVICE_DESCRIPTOR	8
FLOW_ID	4
NAS_INFO_LEN	12
NAS_INFO_DATA	8 × NAS_INFO_LEN

CN_DOMAIN_ID — Core Network Domain Identifier.

The mobile station shall set CN_DOMAIN_ID to the appropriate value as shown in Table 6.4.1.1.3-1.

SERVICE_DESCRIPTOR — Service Descriptor.

The mobile station shall set the SERVICE_DESCRIPTOR field to the appropriate value as shown in 11.2.3.1.1 of TS24.007.

FLOW_ID — Flow Identifier.

The mobile station shall set this field to the flow identifier corresponding to this message.

NAS_INFO_LEN — Non Access Stratum Information Length.

The mobile station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this message.

NAS_INFO_DATA — Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the

mobile station.

6.4.1.3.3 MC-MAP L3 Message

MSG_TAG: MAPL3M

Field	Length (bits)
FLOW_ID	4
NAS_INFO_LEN	12
NAS_INFO_DATA	8 × NAS_INFO_LEN

FLOW_ID — Flow Identifier.

The mobile station shall set this field to the flow identifier corresponding to this message.

NAS_INFO_LEN — Non Access Stratum Information Length.

The mobile station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this message.

NAS_INFO_DATA — Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the mobile station.

6.4.1.3.4 MC-MAP RRC Connection Request Message

MSG_TAG: MAPCRM

Field	Length (bits)
MS_ORIG_IND	1
CAUSE_IND	1
SERVICE_OPTION	0 or 16
OTHER_ESTABLISH_CAUSE	0 or 4
SLOT_CYCLE_INDEX	3
MOB_P_REV	8
OTD_SUPPORTED	0 or 1
QPCH_SUPPORTED	0 or 1
ENHANCED_RC	0 or 1
FOR_RC_PREF	0 or 5
REV_RC_PREF	0 or 5
FCH_SUPPORTED	0 or 1
FCH Capability Type-specific fields	0 or variable
DCCH_SUPPORTED	0 or 1
DCCH Capability Type-specific fields	0 or variable
REV_FCH_GATING_MODE	0 or 1
SILENT_REORG	0 or 1
STS_SUPPORTED	0 or 1
ENC_INFO_INCL	1
SIG_ENCRYPT_SUP	0 or 8
SIG_ENCRYPT_REQ	0 or 1
KEY_SEQ_NEW	0 or 4
UI_ ENCRYPT_SUP	0 or 8
UI_ENCRYPT_REQ	0 or 1

MS_ORIG_IND Mobile Station Origination Indicator.

If this message is being sent in response to a request from Upper Layers, the mobile station shall set this field to '1'; otherwise (if the message is being sent due to receiving *a General Page Message* from the base station) the mobile station shall set this field to '0'.

CAUSE_IND Establishment cause indicator.

If the "establishment cause" (as received from the Upper Layers or the "paging cause" of the *General Page Message*) of this RRC connection request can be mapped to one of the MC-

MAP service options defined in C.R1001-A (i.e., Speech Call, CS Data Call, PS Data Call, or SMS), the mobile station shall set this field to '1'; otherwise, it shall set this field to '0'.

SERVICE_OPTION — Service option number.

If the CAUSE_IND field of this message is set to '0', the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows:

The mobile station shall set this field to the appropriate MC-MAP service option defined in C.R1001-A (i.e., Speech Call, CS Data Call, PS Data Call, or SMS) that corresponds to the "establishment cause" (as received from the Upper Layers or the "paging cause" of the *General Page Message*) of this RRC connection request.

OTHER_ESTABLISH_CAUSE — Other RRC connection establishment Cause.

If the CAUSE_IND field of this message is set to '1', the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows:

The mobile station shall set this field to the "establishment cause" of this RRC connection request (as received from the Upper Layers), as shown in Table 6.4.1.3.2-1.

Table 6.4.1.3.2-1. OTHER_ESTABLISH_CAUSE Codes

OTHER_ESTABLISH_CAUSE (binary)	Connection Establishment Condition
0000	Emergency Call
0001	Inter-system cell re-selection
0010	Location Update (LAU and RAU)
0011	IMSI Detach
All other OTHER_ESTABLISH_CAUSE values are reserved	

The remaining fields are MC-specific fields (as specified in 2.7.1.3.2.4 of 3GPP2 C.S0005-A).

SLOT_CYCLE_INDEX — Slot cycle index.

If the mobile station is configured for slotted mode operation, the mobile station shall set this field to the preferred slot cycle index, $SLOT\_CYCLE\_INDEX_p$ (see 2.6.2.1.1); otherwise, the mobile station shall set this field to '000'.

MOB_P_REV — Protocol revision of the mobile station.

The mobile station shall set this field to '00000111'.

OTD_SUPPORTED — Orthogonal Transmit Diversity supported indicator.

If $P\_REV\_IN\_USE_s$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows.

If the mobile station supports orthogonal transmit diversity, it shall set this field to '1'; otherwise, the mobile station shall set this field to '0'.

QPCH_SUPPORTED — Quick Paging Channel supported indicator.

If P_REV_IN_USE is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows:

If the mobile station supports the Quick Paging Channel, the mobile station shall set this field to '1';

		otherwise, the mobile station shall set this field to '0'.
	ENHANCED_RC	Enhanced radio configuration supported indicator. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows: If the mobile station supports any radio configuration in the Radio Configuration Class 2 (see 1.1.1), the mobile station shall set this field to '1'; otherwise, the mobile station shall set this field to '0'.
	FOR_RC_PREF	Forward Radio Configuration preference. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set this field as follows: The mobile station shall set this field to its preferred Radio Configuration for the Forward Traffic Channel.
	REV_RC_PREF	Reverse FCH Radio Configuration Preference. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows: The mobile station shall set this field to its preferred Radio Configuration for the Reverse Traffic Channel.
	FCH_SUPPORTED	Fundamental Channel supported indicator. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows: The mobile station shall set this field to '1' if the mobile station supports Fundamental Channel; otherwise, the mobile station shall set this field to '0'.
		FCH Capability. Type-specific fields. Fundamental Channel capability information. If the FCH_SUPPORTED field is set to '1', the mobile station shall include this field and set it as defined in 2.7.4.27.1; otherwise, the mobile station shall omit this field.

DCCH_SUPPORTED	Dedicated Control Channel supported indicator. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise the mobile station shall include this field and set it as follows. The mobile station shall set this field to '1' if the mobile station supports Dedicated Control Channel; otherwise, the mobile station shall set this field to '0'. DCCH Capability. Type specific fields. Dedicated Control Channel capability information. If the DCCH_SUPPORTED field is set to '1', the mobile station shall include this field and set it as defined in 2.7.4.27.2; otherwise, the mobile station shall omit this field.
REV_FCH_GATING_MODE	Reverse Fundamental gating mode request indicator. If MOB_P_REV_IN_USE is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows: If $REV\_FCH\_GATING\_SUP_S$ is equal to '1' and if the mobile station requests to turn on eighth gating mode on the Reverse Fundamental Channel, the mobile station shall set this field to '1'; otherwise, the mobile station shall set this field to '0'.
SILENT_REORG	Silent Re-Origination indicator. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows. The mobile station shall set this field to '1', if this message is a result of a silent re-origination; otherwise, the mobile station shall set this field to '0'.
STS_SUPPORTED	STS supported indicator. If $P\_REV\_IN\_USE_S$ is less than six, the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows. The mobile station shall set this field to '1' if the mobile station supports Space Time Spreading Transmit Diversity; otherwise, the mobile station shall set this field to '0'.

ENC_INFO_INCL	Encryption fields included. The mobile station shall set this field to '1' if the encryption related fields are included; otherwise the mobile station shall set this field to '0'. The mobile station shall set this field to '1' if it is unable to determine the base station support for encryption. The mobile station shall set this field to '0' if the base station does not support encryption or if the mobile station does not support any of the encryption modes supported by the base station.
SIG_ENCRYPT_SUP	Signaling Encryption supported indicator. The mobile station shall include this field only if ENC_INFO_INCL is equal to '1'. If included, this field indicates which signaling encryption algorithms are supported by the mobile station. This field consists of the subfields shown in Table 2.7.1.3.2.1-4 of 3GPP2 C.S0005-A.
SIG_ENCRYPT_REQ	Signaling Message encryption request indicator. The mobile station shall include this field if SIG_ENC_INCL is equal to '1'. If this field is included the mobile station shall set this field to '1' to request signaling encryption to be turned on for signaling messages sent on f-dsch, r-dsch, f-csch, and r-csch.
KEY_SEQ_NEW	The key sequence number corresponding to the new encryption key generated by the mobile station. The mobile station shall include this field only if ENC_INFO_INCL is equal to '1' and $STORE\_KEY_S$ is equal to '1'. If this field is included, the mobile station shall set this field to $KEY\_SEQ\_NEW_{S\text{-}P}$, the sequence number associated with the new encryption key generated by the mobile station.
UI_ENCRYPT_SUP	User information Encryption supported indicator. The mobile station shall include this field only ENC_INFO_INCL is equal to '1'. If this field is included, the mobile station shall set this field to indicate the supported user information encryption algorithms. This field consists of the subfields shown in Table 2.7.1.3.2.4-7 of 3GPP2 C.S0005-A.

	UI_ENCRYPT_REQ	Request for user information encryption on the traffic channel indicator. The mobile station shall include this field only if ENC_INFO_INCL is equal to '1'. If included, the mobile station shall set this field to '1' to request user information encryption. Otherwise, the mobile station shall set this field to '0'.

6.4.1.3.5 R-TMSI Assignment Completion Message
MSG_TAG: RTACM
There are no Layer 3 fields associated with this message.

6.4.1.4 r-dsch

6.4.1.4.1 MC-MAP Initial L3 Message
MSG_TAG: MAPIL3M

Field	Length (bits)
CN_DOMAIN_ID	2
SERVICE_DESCRIPTOR	8
FLOW_ID	4
NAS_INFO_LEN	12
NAS_INFO_DATA	8 NAS_INFO_LEN

	CN_DOMAIN_ID	Core Network Domain Identifier. The mobile station shall set CN_DOMAIN_ID to the appropriate value as shown in Table 6.4.1.1.3-1.
	SERVICE_DESCRIPTOR	Service Descriptor. The mobile station shall set the SERVICE_DESCRIPTOR field to the appropriate value as shown in 11.2.3.1.1 of TS24.007.
	FLOW_ID	Flow Identifier. The mobile station shall set this field to the flow identifier corresponding to this message.
	NAS_INFO_LEN	Non Access Stratum Information Length. The mobile station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this

message.

NAS_INFO_DATA — Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the mobile station.

6.4.1.4.2 MC-MAP L3 Message

MSG_TAG: MAPL3M

Field	Length (bits)
FLOW_ID	4
NAS_INFO_LEN	12
NAS_INFO_DATA	8 × NAS_INFO_LEN

FLOW_ID — Flow Identifier.

The mobile station shall set this field to the flow identifier corresponding to this message.

NAS_INFO_LEN — Non Access Stratum Information Length.

The mobile station shall set this field to the number of octets in the NAS_INFO_DATA fields included in this message.

NAS_INFO_DATA — Non Access Stratum Information Data.

These fields include the Upper Layer Non-Access Stratum message received by the RRC entity of the mobile station.

6.4.1.4.3 R-TMSI Assignment Completion Message

MSG_TAG: RTACM

There are no Layer 3 fields associated with this message.

6.4.2 Modified Messages

This section shows changes and fields that are not used or that are ignored in messages from 3GPP2 C.S0005-A.

6.4.2.1 f-csch

6.4.2.1.1 System Parameters Message
The following fields of this message shall not be used: SID, NID, REG_ZONE.

6.4.2.1.2 Access Parameters Message
The following fields of this message shall not be used: AUTH, RANDS, REG_PSIST.

6.4.2.1.3 Extended Systems Parameters Message
The following fields of this message shall not be used: DELETE_FOR_TMSI, USE_TMSI.

6.4.2.1.4 Service Redirection Message
The following fields of this message shall not be used: DELETE_TMSI, NDSS redirection related fields.

6.4.2.1.5 General Page Message
The following fields of this message shall not be used: TMSI_DONE, ORDERED_TMSI.

6.4.2.1.6 Global Service Redirection Message
The following fields of this message shall not be used: DELETE_TMSI, NDSS redirection related fields.

6.4.2.1.7 Extended Channel Assignment Message
The following fields of this message shall not be used: BYPASS_ALERT_ANSWER. Restricted values for GRANTED_MODE.

6.4.2.1.8 Sync Channel Message
The following fields of this message shall not be used: SID, NID.

6.4.2.1.9 Extended Global Service Redirection Message
The following fields of this message shall not be used: DELETE_TMSI, NDSS redirection related fields.

6.4.2.1.10 Enhanced Access Parameters Message
The following fields of this message shall not be used: REG_PSIST_EACH.

6.4.2.1.11 Security Mode Command Message
MSG_TAG: SMCM

Field	Length (bits)
SIG_ENCRYPT_MODE	3
NUM_RECS	3

NUM_RECS occurrences of the following two-field record

CON_REF	8
UI_ENCRYPT_MODE	3

KEY_SIZE	3
ACTION_TIME	6
USE_NEW_KEY	0 or 1
KEY_SEQ	0 or 4
CN_ENC_DOMAIN	0 or 2
CONC_EXT_SEQ_H	0 or 24
RESERVED	0-7 (as needed)

[…]

CN_ENC_DOMAIN Core Network Encryption Domain identifier.

The base station shall include this field only if this message is directed to a mobile station that is operating in the MC-MAP mode. If this field is included, the base station shall set this field as follows:

- The base station shall set this field to '01' to indicate that the encryption key corresponding to the packet switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.
- The base station shall set this field to '00' to indicate that the encryption key corresponding to the circuit switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.

CONC_EXT_SEQ_H Concealed 24 most significant bits of the crypto-sync.

The base station shall include this field only if this message is directed to a mobile station that is operating in the MC-MAP mode.

If this field is included, the base station shall set this field to the XOR of the 24 most significant bits of AK (anonymity key) and 24 most significant bits of the crypto-sync (use for encryption/decryption of signaling messages).

RESERVED Reserved bits.

The mobile station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The mobile station shall set these bits to '0'.

1.1.1.1.12 MC-RR Parameters Message

Additions to the MC-RR Parameters Message (MCRRPM):

R_TMSI_USED	1
DELETE_FOR_R_TMSI	0 or 1
R_TMSI_ZONE_LEN	0 or 4
R_TMSI_ZONE	0 or 8 × TMSI_ZONE_LEN

R_TMSI_USED Radio TMSIs used.

The base station shall set this field to '1' if radio TMSIs are used by the base station; otherwise, the base station shall set this field to '1'. If the base station sets this field to '0', then the mobile station is to delete a previously assigned R_TMSI.

DELETE_FOR_R_TMSI Delete foreign R_TMSI.

The base station shall set this field to '1' to cause the mobile station to delete its R_TMSI if the R_TMSI was assigned in a different R_TMSI zone from that specified by the R_TMSI_ZONE field of this message; otherwise, the base station shall set this field to '0'. If R_TMSI_USED is set to '0', the base station shall omit this field.

R_TMSI_ZONE_LEN TMSI zone length.

The base station shall set this field to the number of octets included in the R_TMSI_ZONE. The base

station shall set this field to a value in the range 1 to 8 inclusive. If R_TMSI_USED is set to '0', the base station shall omit this field.

R_TMSI_ZONE — TMSI zone.

The base station shall set this field to the R_TMSI zone number. If R_TMSI_USED is set to '0', the base station shall omit this field.

6.4.2.2 f-dsch

6.4.2.2.1 In-Traffic Systems Parameter Message

The following fields of this message shall not be used: SID, NID, PACKET_ZONE_ID.

6.4.2.2.2 Service Redirection Message

The following fields of this message shall not be used: DELET_TMSI, EXPECTED_SID.

6.4.2.2.3 General Handoff Direction Message

The following fields of this message shall not be used: PACKET_ZONE_ID.

6.4.2.2.4 Universal Handoff Direction Message

The following fields of this message shall not be used: PACKET_ZONE_ID.

6.4.2.2.5 Candidate Frequency Search Request Message

MSG_TAG: CFSRQM

Field	Length (bits)
USE_TIME	1
ACTION_TIME	6
RESERVED_1	4
CFSRM_SEQ	2
SEARCH_TYPE	2
SEARCH_PERIOD	4
SEARCH_MODE	4
MODE_SPECIFIC_LEN	8
Mode-specific fields	8 × MODE_SPECIFIC_LEN
ALIGN_TIMING	1
SEARCH_OFFSET	0 or 6

[…]

SEARCH_MODE — Search mode.

The base station shall set this field to the SEARCH_MODE value specified in Table 3.7.3.3.2.27-2 corresponding to the type of search specified by this message.

Table 3.7.3.3.2.27-2. SEARCH_MODE Types

SEARCH_MODE (binary)	Description
0000	Searches for CDMA pilots on a Candidate Frequency.
0001	Searches for analog channels.
0010	Search for GSM channels
0011-1111	Reserved

[…]

If SEARCH_MODE is equal to '0010', the base station shall include the following fields:

Field	Length (bits)
SF_TOTAL_EC_THRESH	5
SF_TOTAL_EC_IO_THRESH	5
GSM_RXLEV_THRESH	6
BSIC_VERIF_REQ	1
N_COL_CODE	0 or 3
GSM_T_REF_INCL	1
CDMA_TIME	0 or 6
NUM_GSM_CHAN	5
NUM_GSM_CHAN occurrences of the following record:	
GSM_FREQ_BAND	3
ARFCN	10
GSM_FRAME	0 or 19
GSM_FRAME_FRACT	0 or 9
RESERVED_6	0-7

SF_TOTAL_EC-_THRESH Serving Frequency total pilot E_C threshold.

If the mobile station is not to use the measurement of total E_C of the pilots in the Serving Frequency Active Set in the GSM Frequencies periodic search procedure, the base station shall set this field to '11111'; otherwise, the base station shall set this field to

$\lceil (10 \times \log_{10} (total\_ec\_thresh) + 120) / 2 \rceil$

where *total_ec_thresh* is defined by the following rule:

The mobile station is not to visit any GSM frequency if the total E_C of the pilots in the Serving Frequency Active Set is greater than *total_ec_thresh*.

SF_TOTAL_EC_IO_THRESH	Serving Frequency total pilot E_C/I_O threshold.	
	If the mobile station is not to use the measurement of total E_C/I_O of the pilots in the Serving Frequency Active Set in the GSM Frequencies periodic search procedure, the base station shall set this field to '11111'; otherwise, the base station shall set this field to	
	$\lfloor -20 \times \log_{10}(total\_ec\_io\_thresh) \rfloor$	
	where *total_ec_io_thresh* is defined by the following rule: The mobile station is not to visit any GSM frequency if the total E_C/I_O of the pilots in the Serving Frequency Active Set is greater than *total_ec_io_thresh*.	
GSM_RXLEV_THRESH	GSM RXLEV Threshold.	
	The base station shall set this field to the minimum GSM RXLEV for which the mobile station is to include a candidate frequency and to send the Candidate Frequency Search Report Message. The GSM RXLEV is defined in Section 8.1.4 of GSM 05.08	
BSIC_VERIF_REQ	Base transceiver Station Identity Code verification required.	
	The base station shall set this field to '1' if the verification of the Network Color Code included in the Base transceiver Station Identity Code is required for the corresponding ARFCN (see Section A.1 of GSM 03.03) ; otherwise, the base station shall set it to '0'.	
N_COL_CODE	Network Color Code.	
	If the BSIC_VERIF_REQ is set to '1', the base station shall set this field to the Network Color Code of the GSM system to search as specified in Section 4.3.2 of GSM 03.03. If the BSIC_VERIF_REQ field is set to '0' the base station shall omit this field.	
GSM_T_REF_INCL	GSM Time Reference Included.	
	This field indicates whether a GSM Time Reference is included in this message.	
	If GSM Time Reference is specified in this message, the base station shall set this field to '1'; otherwise, the base station shall set this field to '0'.	
CDMA_TIME	CDMA Time.	
	If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the CDMA System Time, in units	

of 80 ms (modulo 64), to which the GSM_FRAME is referred. If the USE_TIME field is set to '0' the base station shall omit this field.

NUM_GSM_CHAN — Number of GSM Channels.

The base station shall set this field to the number of GSM ARFCN to search.

The base station shall include NUM_GSM_CHAN occurrences of the following six-field record, one for each GSM channel.

GSM_FREQ_BAND — GSM Frequency band.

The base station shall set this field to the GSM Frequency Band of the GSM ARFCN to search as specified in Table 6.4.2.2.5-1.

Table 6.4.2.2.5-1

GSM_FREQ_BAND (binary)	GSM Frequency Band
000	P-GSM 900
001	E-GSM 900
010	R-GSM 900
011	DCS 1800
100	PCS 1900
101 – 111	Reserved

ARFCN — Absolute Radio Frequency Channel Number.

The base station shall set this field to the Absolute Radio Frequency Channel Number to search as specified in Section 2 of GSM 05.05.

GSM_FRAME — GSM Frame number.

If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the GSM frame number valid at the time specified by CDMA_TIME in the GSM target base station, as specified in Section 3.3.2.2 of GSM 05.02. If the GSM_T_REF_INCL field is set to '0', the base station shall omit this field.

GSM_FRAME_FRACT — GSM Frame Fraction.

	If the GSM_T_REF_INCL is set to '1', the base station shall set this field to the number of 1/2^9 fractions of a GSM frame valid at the time specified by CDMA_TIME in the GSM target base station, with range 0 to (2^9-1). The GSM frame duration is specified in Section 4.3.1 of GSM 05.02 as 24/5200 s. If the GSM_T_REF_INCL field is set to '0' the base station shall omit this field.
RESERVED_6	The mobile station shall add reserved bits as needed in order to make the length of the Mode-specific fields equal to an integer number of octets. The mobile station shall set each of these bits to '0'.

6.4.2.2.6 Security Mode Command Message

MSG_TAG: SMCM

Field	Length (bits)
SIG_ENCRYPT_MODE	3
NUM_RECS	3
NUM_RECS occurrences of the following two-field record	
CON_REF	8
UI_ENCRYPT_MODE	3
KEY_SIZE	3
ACTION_TIME	6
USE_NEW_KEY	0 or 1
KEY_SEQ	0 or 4
CN_ENC_DOMAIN	0 or 2
CONC_EXT_SEQ_H	0 or 24
RESERVED	0-7 (as needed)

[…]

CN_ENC_DOMAIN Core Network Encryption Domain identifier.

The base station shall include this field only if this message is directed to a mobile station that is operating in the MC-MAP mode. If included, the base station shall set this field as follows:

- The base station shall set this field to '01' to indicate that the encryption key corresponding to the packet switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.
- The base station shall set this field to '00' to indicate that the encryption key corresponding to the circuit switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.

CONC_EXT_SEQ_H Concealed 24 most significant bits of the crypto-sync.

The base station shall include this field only if this message is directed to a mobile station that is operating in the MC-MAP mode. If this field is included, the base station shall set this

field to the XOR of the 24 most significant bits of AK (anonymity key) and 24 most significant bits of the crypto-sync (use for encryption/decryption of signaling messages).

RESERVED — Reserved bits.

The mobile station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The mobile station shall set these bits to '0'.

6.4.2.3 r-csch

6.4.2.4 r-dsch

6.4.2.4.1 Candidate Frequency Search Report Message

MSG_TAG: CFSRPM

Field	Length (bits)
LAST_SRCH_MSG	1
LAST_SRCH_MSG_SEQ	2
SEARCH_MODE	4
MODE_SPECIFIC_LEN	8
Mode-specific fields	8 × MODE_SPECIFIC_LEN

[…]

If SEARCH_MODE is equal to '0010', the mobile station shall include the following fields:

Field	Length (bits)
SF_TOTAL_RX_PWR	5
NUM_GSM_CHAN	5

NUM_GSM_CHAN occurrences of the following record:

GSM_FREQ_BAND	3
ARFCN	10
BSIC	6
GSM_RXLEV	6

RESERVED_4	0 - 7 (as needed)

SF_TOTAL_RX_PWR – Indicates the total received power on the Serving Frequency.

The mobile station shall set this field to

$$\min(31, \lceil (total\_received\_power + 110) / 2 \rceil)$$

where *total_received_power* is the mean input power received by the mobile station on the Serving Frequency, in dBm/1.23 MHz.

NUM_GSM_CHAN – Number of GSM Channels.

The mobile station shall set this field to the number of GSM channels included in this message.

The mobile station shall include NUM_GSM_CHAN occurrences of the following four-field record, one for each GSM channel.

GSM_FREQ_BAND - GSM Frequency band

The mobile station shall set this field to the GSM Frequency Band of the reported ARFCN as specified in .

ARFCN - Absolute Radio Frequency Channel Number.

The mobile station shall set this field to the Absolute Radio Frequency Channel Number of the reported GSM channel as specified in Section 2 of GSM 05.05.

BSIC - Base transceiver Station Identity Code.

The mobile station shall set this field to the Base transceiver Station Identity Code of the reported GSM channel as specified in Section 4.3.2 of GSM 03.03.

GSM_RXLEV – GSM RXLEV.

The mobile station shall set this field to the GSM RXLEV of the reported GSM channel as specified in Section 8.1.4 of GSM 05.08. RESERVED_4 – Reserved.

The mobile station shall add reserved bits as needed in order to make the length of the Mode-specific fields equal to an integer number of octets. The mobile station shall set each of these bits to '0'.

6.4.3 Orders

Table 6.4.3-1 lists all the r-csch and r-dsch orders used in 3GPP2 C.S0005-A, and states their disposition in the MC-MAP standard. See 2.7.3 of 3GPP2 C.S0005-A for details of these orders.

Table 6.4.3-1. Orders Used on the r-csch and the r-dsch

r-csch Order	r-dsch Order	Name/Function	Disposition in MC-MAP
Y	Y	*Base Station Challenge Order* (see 2.7.3.1 of C.S0005-A)	Not used.
Y	Y	*SSD Update Confirmation Order*	Not used.
Y	Y	*SSD Update Rejection Order*	Not used.
N	Y	*Parameter Update Confirmation Order* (where 'nnnn' is the Request Number)	Used, as it is.
N	Y	*Request Wide Analog Service Order*	Not used.
N	Y	*Request Narrow Analog Service Order*	Not used.
N	Y	*Request Analog Service Order*	Not used.
Y	Y	*Mobile Station Acknowledgment Order* (see C.S0004-A)	Used, as it is.
N	Y	*Service Option Request Order* (Band Class 0 only) (see 2.7.3.2 of C.S0005-A)	Not used.
N	Y	*Service Option Response Order* (Band Class 0 only) (see 2.7.3.3 of C.S0005-A)	Not used.
Y	Y	*Release Order* (normal release)	Used, as it is.
Y	Y	*Release Order* (with power-down indication)	Used, as it is.
N	Y	*Long Code Transition Request Order* (request public)	Not used.
N	Y	*Long Code Transition Request Order* (request private)	Not used.
N	Y	*Long Code Transition Response Order* (use public)	Not used.
N	Y	*Long Code Transition Response Order* (use private)	Not used.

N	Y	*Connect Order*	Not used.
N	Y	*Continuous DTMF Tone Order* (where 'nnnn' is the tone per Table 2.7.1.3.2.4-4 of C.S0005-A).	Not used.
N	Y	*Continuous DTMF Tone Order* (Stop continuous DTMF tone)	Not used.
N	Y	*Service Option Control Order* (Band Class 0 only) (the specific control is designated by 'nnnnnnnn' as determined by each service option)	Not used.
Y	Y	*Local Control Response Order* (specific response as designated by 'nnnnnnnn' as determined by each system)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (unspecified reason; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (message not accepted in this state; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (message structure not acceptable; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (message field not in valid range; see 2.7.3.4 of C.S0005-A)	Used, as it is.
N	Y	*Mobile Station Reject Order* (message type or order code not understood; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (message requires a capability that is not supported by the mobile station; see 2.7.3.4 of C.S0005-A)	Used, as it is.

Y	Y	*Mobile Station Reject Order* (message cannot be handled by the current mobile station configuration; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (response message would exceed allowable length; see 2.7.3.4 of C.S0005-A)	Used, as it is.
Y	Y	*Mobile Station Reject Order* (information record is not supported for the specified band class and operating mode; see 2.7.3.4 of C.S0005-A)	Used, as it is.
N	Y	*Mobile Station Reject Order* (search set not specified; see 2.6.6.2.5.1 of C.S0005-A)	Used, as it is.
N	Y	*Mobile Station Reject Order* (invalid search request; see 2.6.6.2.5.1 of C.S0005-A)	Used, as it is.
N	Y	*Mobile Station Reject Order* (invalid Frequency Assignment; see 2.6.6.2.5.1 of C.S0005-A)	Used, as it is.
N	Y	*Mobile Station Reject Order* (search period too short; see 2.6.6.2.5.1 of C.S0005-A)	Used, as it is.
Y	N	*Mobile Station Reject Order* (RC does not match with the value in the field DEFAULT_CONFIG; see 2.6.3.3 and 2.6.3.5 of C.S0005-A)	Used, as it is.
Y	N	*Mobile Station Reject Order* (Encryption key with the specified KEY_SEQ not stored)	Used, as it is.
N	Y	*Mobile Station Reject Order* (call assignment not accepted)	Not Used.

N	Y	*Mobile Station Reject Order* (no call control instance present with the specified identifier)	Not Used.
N	Y	*Mobile Station Reject Order* (a call control instance is already present with the specified identifier)	Not Used.

1

Table 6.4.3-2 lists all the f-csch and f-dsch orders used in 3GPP2 C.S0005-A, and states their disposition in the MC-MAP standard. See 3.7.4 of 3GPP2 C.S0005-A for details of these orders.

Table 6.4.3-2. Orders Used on the f-csch and the f-dsch

f-csch Order	f-dsch Order	Name/Function	Disposition in MC-MAP
Y	N	*Abbreviated Alert Order*	Not used.
Y	Y	*Base Station Challenge Confirmation Order* (see 3.7.4.1 of C.S0005-A)	Not used.
N	Y	*Message Encryption Mode Order* (where nn is the mode per Table 3.7.2.3.2.8-2 of C.S0005-A)	Used, as it is.
Y	N	*Reorder Order*	Not used.
N	Y	*Parameter Update Order* (where 'nnnn' is the Request Number)	Used, as it is.
Y	Y	*Audit Order*	Used, as it is.
Y	N	*Intercept Order*	Used, as it is.
N	Y	*Maintenance Order*	Not used.
N	Y	*Pilot Measurement Request Order*	Used, as it is.
N	Y	*Periodic Pilot Measurement Request Order* (see 3.7.4.6 of C.S0005-A)	Used, as it is.
Y	Y	*Lock Until Power-Cycled Order* (where nnnn is the lock reason)	Used, as it is.
Y	Y	*Maintenance Required Order* (where nnnn is the maintenance reason)	Used, as it is.
Y	N	*Unlock Order*	Used, as it is.
N	Y	*Service Option Request Order* (Band Class 0 only) (see 3.7.4.2 of C.S0005-A)	Not used.

N	Y	*Service Option Response Order* (Band Class 0 only; see 3.7.4.3 of C.S0005-A)	Not used.
Y	Y	*Release Order* (no reason given)	Used, as it is.
Y	Y	*Release Order* (indicates that requested service option is rejected)	Used, as it is.
N	Y	*Outer Loop Report Order*	Used, as it is.
N	Y	*Long Code Transition Request Order* (request public)	Not used.
N	Y	*Long Code Transition Request Order* (request private)	Not used.
N	Y	*Continuous DTMF Tone Order* (where the tone is designated by 'nnnn' as defined in Table 2.7.1.3.2.4-4 of C.S0005-A)	Not used.
N	Y	*Continuous DTMF Tone Order* (stop continuous DTMF tone)	Not used.
N	Y	*Status Request Order* (see 3.7.4.4 of C.S0005-A)	Used, as it is.
Y	N	*Registration Accepted Order* (ROAM_INDI not included; see 3.7.4.5 of C.S0005-A)	Not Used.
Y	N	*Registration Request Order*	Not used.
Y	N	*Registration Rejected Order*	Not used.
Y	N	*Registration Rejected Order* (delete TMSI)	Not Used.

Y	N	*Registration Accepted Order* (ROAM_INDI included; see 3.7.4.5 of C.S0005-A)	Not used.
Y	N	*Registration Accepted Order* (ROAM_INDI, EXT_ENC_MSB, SIG_ENCRYPT_MODE, and KEY_SIZE included; see 3.7.4.5 of C.S0005-A)	Not used.
N	Y	*Service Option Control Order* (Band Class 0 only) (the specific control is designated by 'nnnnnnnn' as determined by each service option)	Not used.
Y	Y	*Local Control Order* (the specific order is designated by 'nnnnnnnn' as determined by each system)	Used, as it is.
Y	N	*Slotted Mode Order* (transition to the slotted mode operation.)	Used, as it is.
Y	Y	*Retry Order* (indicates that the requested service is rejected and retry delay is included, see 3.7.4.7 of C.S0005-A)	Used, as it is.

6.4.4 Information Records

Table 6.4.4-1 lists all the r-csch and r-dsch information records used in 3GPP2 C.S0005-A, and states their disposition in the MC-MAP standard. See 2.7.4 of 3GPP2 C.S0005-A for details of these information records.

Table 6.4.4-1. Information Record Types used on r-csch and r-dsch

Information Record	r-csch	r-dsch	Disposition in MC-MAP
Feature Indicator	N	Y	Not used.
Keypad Facility	N	Y	Not used.
Called Party Number	N	Y	Not used.
Calling Party Number	N	Y	Not used.
Call Mode	N	Y	Not used.
Terminal Information	Y	Y	Used, as it is.
Roaming Information	Y	Y	Not used.
Security Status	N	Y	Used, with modifications (see 6.4.4.1)
Connected Number	N	Y	Not used.
IMSI	Y	Y	Used, as it is.
ESN	N	N	Used, as it is.
Band Class Information	Y	Y	Used, as it is.
Power Class Information	Y	Y	Used, as it is.
Operating Mode Information	Y	Y	Used, as it is.
Service Option Information	Y	Y	Used, as it is.
Multiplex Option Information	Y	Y	Used, as it is.
Service Configuration Information	N	Y	Used, with modifications (see 6.4.4.2)
Called Party Subaddress	N	Y	Not used.
Calling Party Subaddress	N	Y	Not used.
Connected Subaddress	N	Y	Not used.
Power Control Information	Y	Y	Used, as it is.
IMSI_M	N	N	Not Used.
IMSI_T	Y	Y	Used, as it is.
Capability Information	Y	Y	Used, as it is.
Channel Configuration Capability Information	Y	Y	Used, as it is.
Extended Multiplex Option Information	Y	Y	Used, as it is.
User Zone Update Request	N	Y	Not used.
Global Emergency Call	N	Y	Not used.
Hook Status	Y	Y	Not used.
QoS Parameters	Y	Y	Not used.
Geo-location Information	Y	Y	Not used.

Extended Record Type — International	Not used.

Table 6.4.4-2 lists all the f-csch and f-dsch information records used in 3GPP2 C.S0005-A, and states their disposition in the MC-MAP standard. See 3.7.5 of 3GPP2 C.S0005-A for details of these information records.

Table 6.4.4-2. Information Record Types used on f-csch and f-dsch

Information Record	f-csch	f-dsch	Disposition in MC-MAP
Display	Y	Y	Not used.
Called Party Number	Y	Y	Not used.
Calling Party Number	Y	Y	Not used.
Connected Number	N	Y	Not used.
Signal	Y	Y	Not used.
Message Waiting	Y	Y	Not used.
Service Configuration	N	Y	Used, with modifications (see 6.4.4.2)
Called Party Subaddress	Y	Y	Not used.
Calling Party Subaddress	Y	Y	Not used.
Connected Subaddress	N	Y	Not used.
Redirecting Number	Y	Y	Not used.
Redirecting Subaddress	Y	Y	Not used.
Meter Pulses	N	Y	Not used.
Parametric Alerting	Y	Y	Not used.
Line Control	N	Y	Not used.
Extended Display	Y	Y	Not used.
User Zone Update	N	Y	Not used.
User Zone Reject	Y	Y	Not used.
Non-Negotiable Service Configuration	N	Y	Used, as it is.
Multiple Character Extended Display	Y	Y	Not used.
Call Waiting Indicator	N	Y	Not used.
Extended Record Type – International			Not used.

6.4.4.1 Security Status

The following field of this information record shall not be used: AUTH_MODE.

6.4.4.2 Service Configuration

The Service Configuration Record defined in 3GPP2 C.S0005-A is modified as follows for MC-MAP operation:

- The fields CC_INFO_INCL, RESPONSE_IND, TAG, BYPASS_ALERT_ANSWER shall be ignored by the MC-MAP mobile station and base station.
- The following new fields are added: NEW_RB_INCL, CN_DOMAIN_ID, NAS_BINDING_INFO, RB_ID, and CN_ENC_DOMAIN.

Type-Specific Field	Length (bits)
[…]	[…]
NUM_CON_REC	8

NUM_CON_REC occurrences of the following variable length record:

RECORD_LEN	8
[…]	[…]
UI_ENCRYPT_MODE	3
NEW_RB_INCL	0 or 1
CN_DOMAIN_ID	0 or 2
NAS_BINDING_INFO	0 or 16
RB_ID	0 or 4
RESERVED	0-7 (as needed)

Type-Specific Field	Length (bits)
[…]	[…]
CN_ENC_DOMAIN	0 or 2
RESERVED	0-7 (as needed)
[…]	[…]

The definitions of these new fields are as follows on the base station side (3.7.5.7 of 3GPP2 C.S0005-A):

NEW_RB_INCL New Radio Bearer included indicator.

The base station shall include this field only if being sent to a MC-MAP mobile station.

If the radio bearer is part of the current service configuration, the base station should set this field to '0'; otherwise, the base station shall set this field to '1'.

CN_DOMAIN_ID Core network domain identity.

If NEW_RB_INCL is set to '0', the base station shall omit this field; otherwise, the base station shall include this field and set it as follows:

The base station shall set this field to the core network domain identity corresponding to this radio bearer, as shown in Table 6.4.1.1.3-1.

NAS_BINDING_INFO Non Access Stratum binding information.

If NEW_RB_INCL is set to '0', the base station shall omit this field; otherwise, the base station shall include this field and set it as follows:

The base station shall set this field to the NAS binding info corresponding to this radio bearer.

RB_ID Radio Bearer identity.

The base station shall include this field only if being sent to a MC-MAP mobile station.

The base station shall set this field to the identity corresponding to this radio bearer.

[…]

CN_ENC_DOMAIN Core Network Encryption Domain identifier.

The base station shall include this field only if this message is directed to a mobile station that is operating in the MC-MAP mode. If included, the base station shall set this field to '01' to indicate that the encryption key corresponding to the packet switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message. The base station shall set this field to '00' to indicate that the encryption key corresponding to the circuit switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.

The definitions of these new fields are as follows on the mobile station side (2.7.4.18 of 3GPP2 C.S0005-A):

NEW_RB_INCL New Radio Bearer included indicator.

For a *Status Response Message*, the mobile station shall set this field to '1'.

For a *Service Request Message* and a *Service Response Message*, if the radio bearer is part of the current service configuration, the mobile station shall set this field to '0'; otherwise, the mobile station shall set this field to '1'.

CN_DOMAIN_ID Core network domain identity.

If NEW_RB_INCL is set to '0', the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows:

For a *Status Response Message*, the mobile station shall set this field to the core network domain identity corresponding to this radio bearer.

For a *Service Request Message* and a *Service Response Message*, the mobile station shall set this field to the core network domain identity set by the base station to this radio bearer.

NAS_BINDING_INFO Non Access Stratum binding information.

If NEW_RB_INCL is set to '0', the mobile station shall omit this field; otherwise, the mobile station shall include this field and set it as follows:

For a *Status Response Message*, the mobile station shall set this field to the NAS binding info corresponding to this radio bearer.

For a *Service Request Message* and a *Service Response Message*, the mobile station shall set this field to the NAS binding info set by the base station to this radio bearer.

RB_ID Radio Bearer identity.

For a *Status Response Message*, the mobile station shall set this field to the identity corresponding to this radio bearer.

For a *Service Request Message* and a *Service Response Message*, the mobile station shall set this field to the identity set by the base station to this radio bearer.

[…]

CN_ENC_DOMAIN Core Network Domain identifier.

The mobile station shall include this field only if operating in the MC-MAP mode. If included, the base station shall set this field to '01' to indicate that the encryption key corresponding

to the packet switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message. The base station shall set this field to '00' to indicate that the encryption key corresponding to the circuit switched core network domain is to be used for signaling encryption and encryption of the service option connections included in this message.

6.4.5 Other Modifications

The following change applies to "Encoding of the MNC":

The MNC binary mapping is defined as follows:

1. Represent the Mobile Network Code as D_1 D_2 D_3 with the digit equal to zero being given the value of ten. If the Mobile Network Code consists of two digits, then set D1 equal to ten.
2. Compute $100 \times D_1 + 10 \times D_2 + D_3 - 111$.
3. Convert the result in step (2) to binary by a standard decimal-to-binary conversion as described in Table 2.3.1.1-1 of 3GPP2 C.S0005-A.

6.5 Modifications to Support PLCM_TYPE

The addition of PLCM_TYPE requires the following changes to 3GPP2 C.S0005-A:

Note: Where text from the 3GPP2 C.S000x-A series is modified, section headers point to the associated part of 3GPP2 C.S0005-A. Ellipsis […] indicate blocks of unchanged text.

1.1.2.2 CDMA Numeric Information

[…]

Public Long Code Mask. The long code mask used to form the public long code. The mask can contain a permutation of the mobile station's ESN, the TMSI code, or the particular mask specified by the base station. The mask also includes the channel number when used for a Supplemental Code Channel. See also Private Long Code Mask and Long Code.

[…]

2.3.6 Public Long Code Mask

The Public Long Code Mask consists of 42 bits. The 37 least significant bits (PLCM_37) are set as follows:

If PLCM_TYPE$_s$ is equal to '00', bits M_{36} through M_{32} shall be set to '11000'; bits M_{31} through M_0 shall be set to a permutation of the mobile station's ESN as follows:

- ESN = (E_{31}, E_{30}, E_{29}, E_{28}, E_{27}, E_{26}, E_{25}, . . . E_2, E_1, E_0)
- Permuted ESN = (E_0, E_{31}, E_{22}, E_{13}, E_4, E_{26}, E_{17}, E_8, E_{30}, E_{21}, E_{12}, E_3, E_{25}, E_{16}, E_7, E_{29}, E_{20}, E_{11}, E_2, E_{24}, E_{15}, E_6, E_{28}, E_{19}, E_{10}, E_1, E_{23}, E_{14}, E_5, E_{27}, E_{18}, E_9) = (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0).

If PLCM_TYPE$_s$ is equal to '01', bits M_{36} through M_{32} shall be set to '11010'; bits M_{31} through M_0 shall be set as follows.

- If TMSI code is four octets, bits M_{31} through M_0 shall be set to the mobile station's TMSI_CODE:

  TMSI_CODE = (T_{31}, T_{30}, T_{29}, . . . T_2, T_1, T_0) = (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0).

- If TMSI code is less than four octets, the (32 – the length of TMSI_CODE) the remaining bits shall be set as the least significant bits of TMSI_ZONE. Bits M_{31} through M_0 shall be set as follows (where TZ stands for the bits of TMSI_ZONE and T stands for the bits of TMSI_CODE):
  - (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0) = (TZ_7, . . . , TZ_0, T_{23}, . . . , T_0), if TMST_CODE is 3 octets.
  - (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0) = (TZ_{15}, . . . , TZ_0, T_{15}, . . . , T_0), if TMST_CODE is 2 octets.

If PLCM_TYPE$_s$ is equal to '10', bits M_{36} through M_{32} shall be set to '11011'; bits M_{31} through M_0 of the public long code mask are specified by PLCM_32$_s$ as follows:

PLCM_32$_s$ = (P_{31}, P_{30}, P_{29}, . . . P_2, P_1, P_0) = (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0).

If PLCM_TYPE$_s$ is equal to '11', bits M_{36} through M_{32} shall be set to '11010'; bits M_{31} through M_0 shall be set to the mobile station's R_TMSI_CODE:

R_TMSI_CODE = (R_{31}, R_{30}, R_{29}, . . . R_2, R_1, R_0) = (M_{31}, M_{30}, M_{29}, . . . M_2, M_1, M_0).

2.6.3.3 Page Response Substate

In this substate, the mobile station sends a *Page Response Message* in response to a *General Page Message* from a base station. If a base station responds to the *Page Response Message* with an authentication request, the mobile station responds in this substate.

Upon entering the *Page Response Substate*, the mobile station shall set $RL\_GAIN\_ADJ_s$ to '0000' , set $PLCM\_TYPE_s$ to '00', and send a *Page Response Message.*

[…]

5. *Extended Channel Assignment Message:* The mobile station shall process the message as follows:

- If ASSIGN_MODEr equals '000', the mobile station shall perform the following actions:
  - If $FREQ\_INCL_r$ equals '0', the mobile station shall perform the following actions:

[…]

    + The mobile station shall set $FPC\_SUBCHAN\_GAIN_s$ to $FPC\_SUBCHAN\_GAIN_r$.
    + The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.
    + The mobile station shall set $PLCM\_TYPE_s$ to $PLCM\_TYPE_r$ if $PLCM\_TYPE\_INCL_r$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_s$ to '00'.
    + The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.
    + The mobile station shall then enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.
  - If $FREQ\_INCL_r$ equals '1', and if the band class is not supported by the mobile station, the mobile station shall send a *Mobile Station Reject Order* with ORDQ field set to '00000110' (capability not supported by the mobile station) and shall remain in the *Page Response Substate*.
  - If $FREQ\_INCL_r$ equals '1', and if the band class is supported by the mobile station, the mobile station shall perform the following actions:

[…]

    + The mobile station shall set $FPC\_SUBCHAN\_GAIN_s$ to $FPC\_SUBCHAN\_GAIN_r$.
    + The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.
    + The mobile station shall set $PLCM\_TYPE_s$ to $PLCM\_TYPE_r$ if $PLCM\_TYPE\_INCL_r$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_s$ to '00'.
    + <u>The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.</u>
    + The mobile station shall initialize CODE_CHAN_LIST as described in 2.6.8, and shall set $SERV\_NEG_s$ to enabled.

+ The mobile station shall then tune to the new Frequency Assignment and shall enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.

[…]

- If ASSIGN_MODEr equals '100', the mobile station shall perform the following actions:

[…]

– The mobile station shall store the Forward power control subchannel relative gain [$FPC\_SUBCHAN\_GAIN_s = FPC\_SUBCHAN\_GAIN_r$).

– The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.

– The mobile station shall set $PLCM\_TYPE_s$ to $PLCM\_TYPE_r$ if $PLCM\_TYPE\_INCL_r$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_s$ to '00'.

– The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.

[…]

2.6.3.5 Mobile Station Origination Attempt Substate

In this substate, the mobile station sends an *Origination Message*. If the base station responds to the *Origination Message* with an authentication request, the mobile station responds in this substate.

Upon entering the *Mobile Station Origination Attempt Substate*, the mobile station shall set $RL\_GAIN\_ADJ_s$ to '0000' , set $PLCM\_TYPE_s$ to '00', and perform the following:

[…]

5. *Extended Channel Assignment Message:* The mobile station shall process the message as follows:

- If $ASSIGN\_MODE_r$ equals '000', the mobile station shall perform the following actions:

[…]

– If $FREQ\_INCL_r$ equals '0', the mobile station shall perform the following actions:

[…]

+ The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.

+ The mobile station shall set $PLCM\_TYPE_{\underline{s}}$ to $PLCM\_TYPE_{\underline{r}}$ if $PLCM\_TYPE\_INCL_{\underline{r}}$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_{\underline{s}}$ to '00'.

+ The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.

+ The mobile station shall then enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.

[…]

– If $FREQ\_INCL_r$ equals '1', the mobile station shall perform the following actions:

[…]

+ The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.

+ The mobile station shall set $PLCM\_TYPE_s$ to $PLCM\_TYPE_r$ if $PLCM\_TYPE\_INCL_r$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_s$ to '00'.

+ The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.

+ The mobile station shall then tune to the new Frequency Assignment and enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.

[…]

- If $ASSIGN\_MODE_r$ equals '100', the mobile station shall perform the following actions:

[…]

  - The mobile station shall set $RL\_GAIN\_ADJ_s$ to $RL\_GAIN\_ADJ_r$.
  - The mobile station shall set $PLCM\_TYPE_s$ to $PLCM\_TYPE_r$ if $PLCM\_TYPE\_INCL_r$ is equal to '1'; otherwise, the base station shall set $PLCM\_TYPE_s$ to '00'.
  - The mobile station shall set $PLCM\_32_s$ to $PLCM\_32_r$ if $PLCM\_TYPE_r$ is equal to '10'.
  - The mobile station shall store the channel indicator ($CH\_IND\_FROM\_MSG_s$ = CH_IND_r) and the mobile station shall perform the following actions:

[…]

3.7.2.3.2.21 Extended Channel Assignment Message

MSG_TAG: ECAM

Field	Length (bits)
ASSIGN_MODE	3
RESERVED_2	5
Additional record fields	8 × (ADD_RECORD_LEN – 1)

If ASSIGN_MODE = ‘000’, the additional record fields shall be:

FREQ_INCL	1
DEFAULT_CONFIG	3
BYPASS_ALERT_ANSWER	1
RESERVED	1
NUM_PILOTS	3
GRANTED_MODE	2
FRAME_OFFSET	4
ENCRYPT_MODE	2
BAND_CLASS	0 or 5
CDMA_FREQ	0 or 11

NUM_PILOTS plus one occurrence of the following record:

PILOT_PN	9
PWR_COMB_IND	1
CODE_CHAN	8

FOR_FCH_RC	5
REV_FCH_RC	5
FPC_FCH_INIT_SETPT	8
FPC_SUBCHAN_GAIN	5
RL_GAIN_ADJ	4
FPC_FCH_FER	5
FPC_FCH_MIN_SETPT	8
FPC_FCH_MAX_SETPT	8
PLCM_TYPE_INCL	1
PLCM_TYPE	0 or 2
PLCM_32	0 or 32
RESERVED	0 – 7 (as needed)

2

[…]

If ASSIGN_MODE = ‘100’, the additional record fields shall be:

FREQ_INCL	1
BAND_CLASS	0 or 5
CDMA_FREQ	0 or 11
BYPASS_ALERT_ANSWER	1
GRANTED_MODE	2
DEFAULT_CONFIG	3
FOR_RC	5
REV_RC	5
FRAME_OFFSET	4
ENCRYPT_MODE	2
FPC_SUBCHAN_GAIN	5
RL_GAIN_ADJ	4
NUM_PILOTS	3
CH_IND	2
CH_RECORD_LEN	5
CH_RECORD_FIELDS	8 × CH_RECORD_LEN
PLCM_TYPE_INCL	1
PLCM_TYPE	0 or 2
PLCM_32	0 or 32
RESERVED	0 – 7 (as needed)

If the ASSIGN_MODE field is set to ‘000’, the base station shall include the following fields:

[…]

PLCM_TYPE_INCL The Public Long Code Mask type included indicator.

The base station shall set this field to ‘1’ if the base station include PLCM_TYPE in the message; otherwise, the base station shall set this field to ‘0’.

PLCM_TYPE The Public Long Code Mask type indicator.

If PLCM_TYPE_INCL is set to ‘0’, the base station shall omit this field; otherwise, the base station shall include this field and set it to the corresponding Public Long Code Mask type as specified in Table 3.7.2.3.2.21 - x.

Table 3.7.2.3.2.21-x. The Public Long Code Mask Type

PLCM_TYPE (binary)	Descriptions
00	ESN
01	TMSI
10	The Specific PLCM
11	Reserved

PLCM_32 — The 32 LSBs bits of the Public Long Code Mask.

If PLCM_TYPE is set to '10', the base station shall include this field and set it to the 32 least significant bits of the public long code mask used by the mobile station; otherwise, the base station shall omit this field.

If the ASSIGN_MODE field is set to '100', the base station shall include the following fields:

[…]

PLCM_TYPE_INCL — The Public Long Code Mask type included indicator.

The base station shall set this field to '1' if the base station include PLCM_TYPE in the message; otherwise, the base station shall set this field to '0'.

PLCM_TYPE — The Public Long Code Mask type indicator.
If PLCM_TYPE_INCL is set to '0', the base station shall omit this field; otherwise, the base station shall include this field and set it as follows: The base station shall set this field to the corresponding Public Long Code Mask type as specified in Table 3.7.2.3.2.21 - x.

PLCM_32 — The 32 LSBs bits of the Public Long Code Mask.

If PLCM_TYPE is set to '10', the base station shall include this field and set it to the 32 least significant bits of the public long code mask used by the mobile station; otherwise, the base station shall omit this field.

6.6 Additions to 1.1.2.2 of 3GPP2 C.S0005-A

ASSIGNING_R_TMSI_ZONE$_S$. Assigning Radio TMSI zone. The R-TMSI zone with which the mobile station most recently registered.

MAP_SYS_PAR_MSG_SEQ$_S$ – MC-MAP *Systems Information Message* sequence number.

RR_REG_COUNT$_S$. Timer-based counter maintained by mobile station for timer-based RR registration.

RR_REG_COUNT_MAX$_S$. Maximum value that RR_REG_COUNT$_S$ can have.

RR_REG_ENABLED$_S$. One-bit flag to indicate if the mobile station can perform RR-level registration. Set to '1' only if the mobile station has a valid R-TMSI assigned.

R_TMSI_CODE$_S$. Radio TMSI code. The R-TMSI code corresponding to the zone with which the mobile station most recently registered.

R_ZONE_LIST$_S$. Radio TMSI zone list. List of R-TMSIs the mobile station has been assigned each time it registerd.

TIMER_REG$_S$. Flag to indicate whether timer based RR registration is enabled or not.

TOT_R_TMSI_ZONES$_S$. Number of entries in R_ZONE_LIST$_S$.

6.7 MC-MAP Identities

A unique International Mobile Subscriber Identity (IMSI) is allocated to each mobile subscriber. Temporary Mobile Subscriber Identities (TMSI) may be allocated to support the subscriber identity confidentiality. A mobile station may be allocated two TMSIs, one for services provided through the MSC, and the other for services provided through the SGSN (P-TMSI). IMSI and TMSI are defined in section 2 of 3GPP TS 23.003. Location areas and base stations are identified as shown in section 4 of 3GPP TS 23.003.

The mobile station equipment is uniquely defined by the International Mobile station Equipment Identity and Software Version Number (IMEISV) or the International Mobile station Equipment Identity (IMEI) The IMEI and IMEISV are defined in section 6 of 3GPP TS 23.003.

6.8 Revision Identification

The MC-MAP air interface revision is identified by P_REV, MOB_P_REV and MIN_P_REV fields in the signaling messages as specified in 3GPP2 C.S0005-A, with the following modification: The above fields identify only the revision level of the following MC-MAP protocol layers: Layer 1, MAC, LAC and MC-MAP RRC.

The P_REV and MOB_P_REV associated with the current release of the MC-MAP specification are equal to '00000111'.

6.9 Example MC-MAP Call Flows

This section presents example message flows in the MC-MAP system.

6.9.1 Location Update

Figure 6.9.1-1 shows example message flow of mobile station location update.

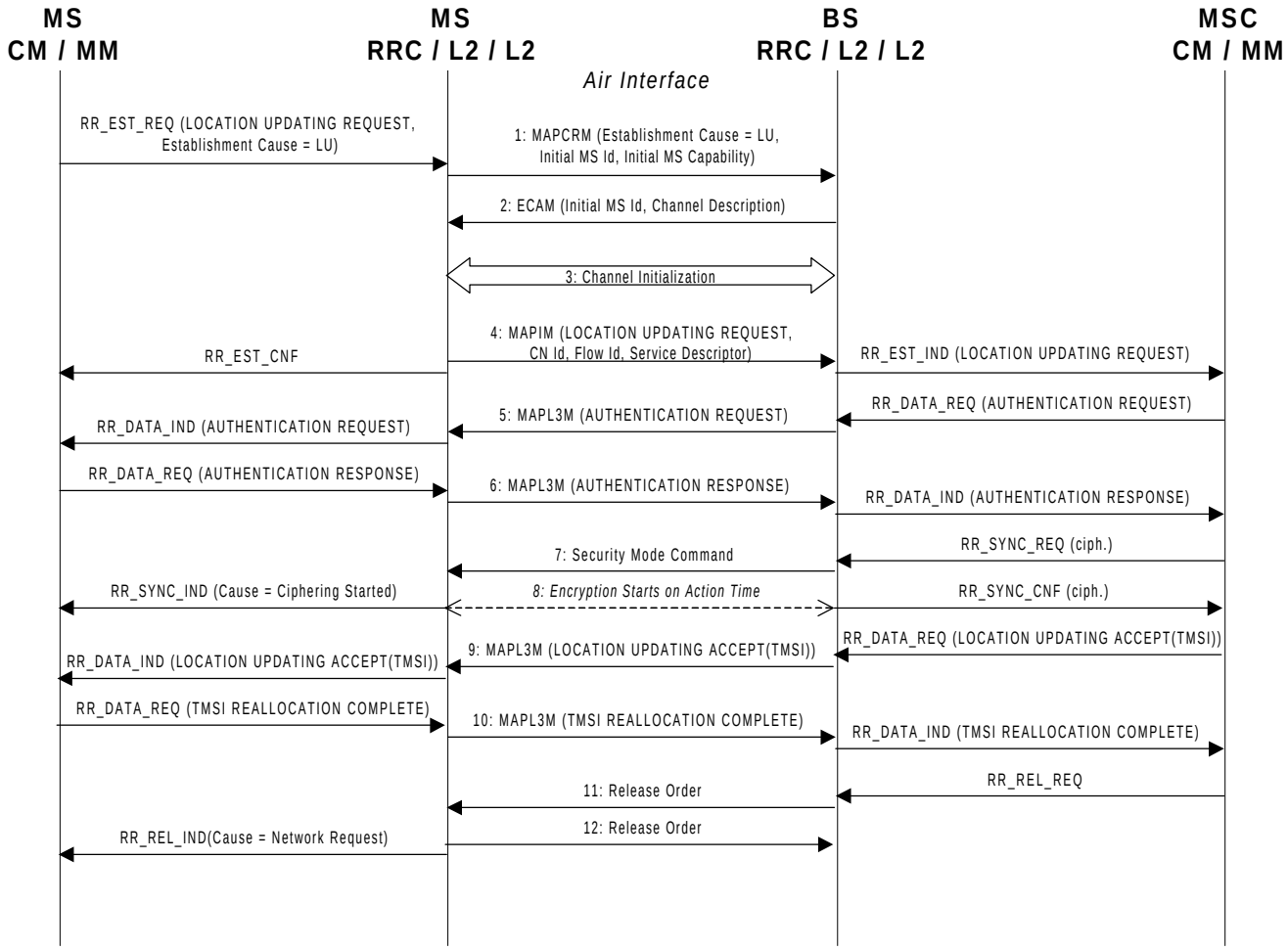

Figure 6.9.1-1. Example Location Update Message Flow

6.9.2 Mobile Originated Call Setup

Figure 6.9.2-1 shows example message flow of mobile originated voice call setup.

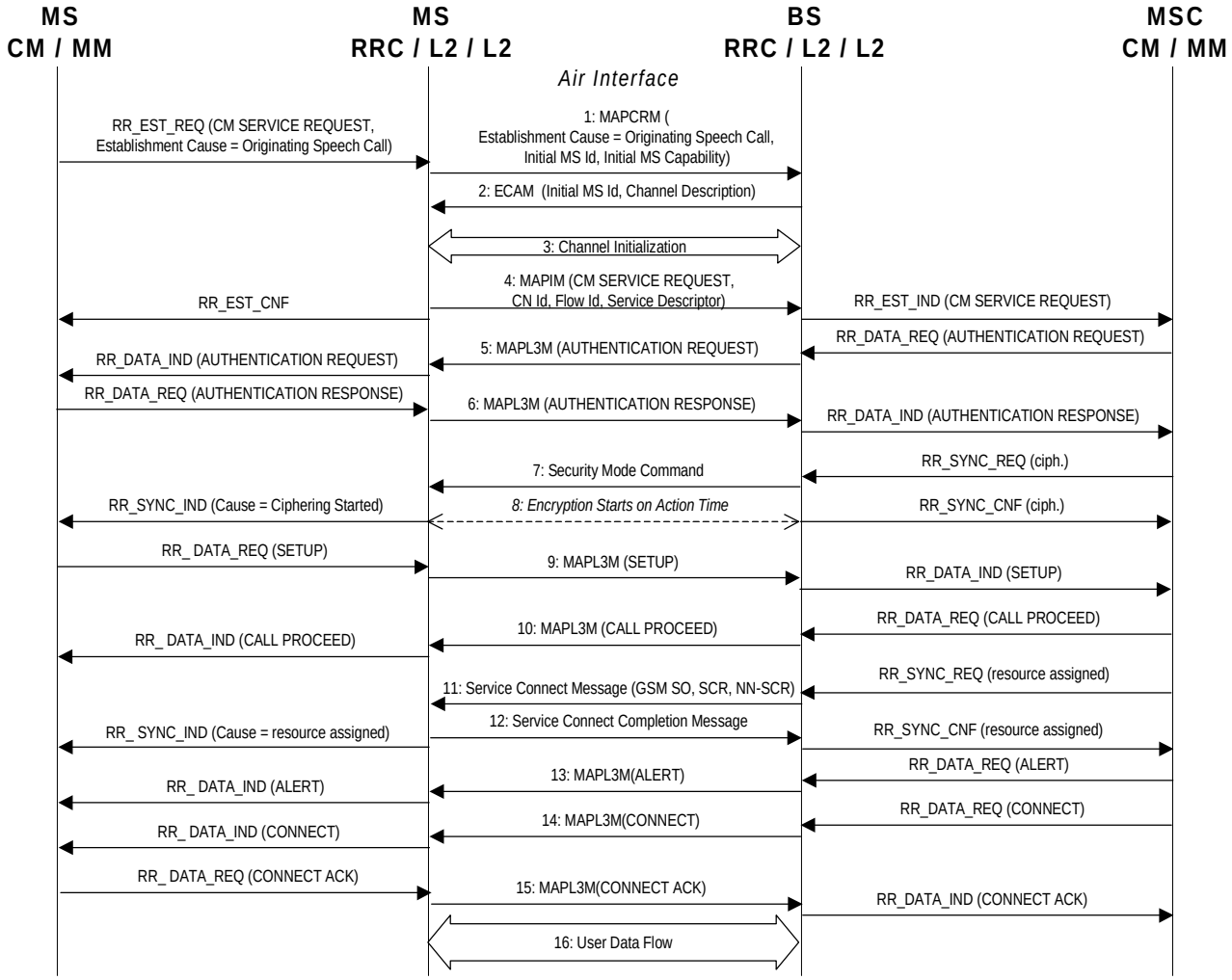

Figure 6.9.2-1. Example Mobile Originated Call Setup Message Flow

6.9.3 Mobile Terminated Call Setup

Figure 6.9.2-1 shows example message flow of mobile terminated voice call setup.

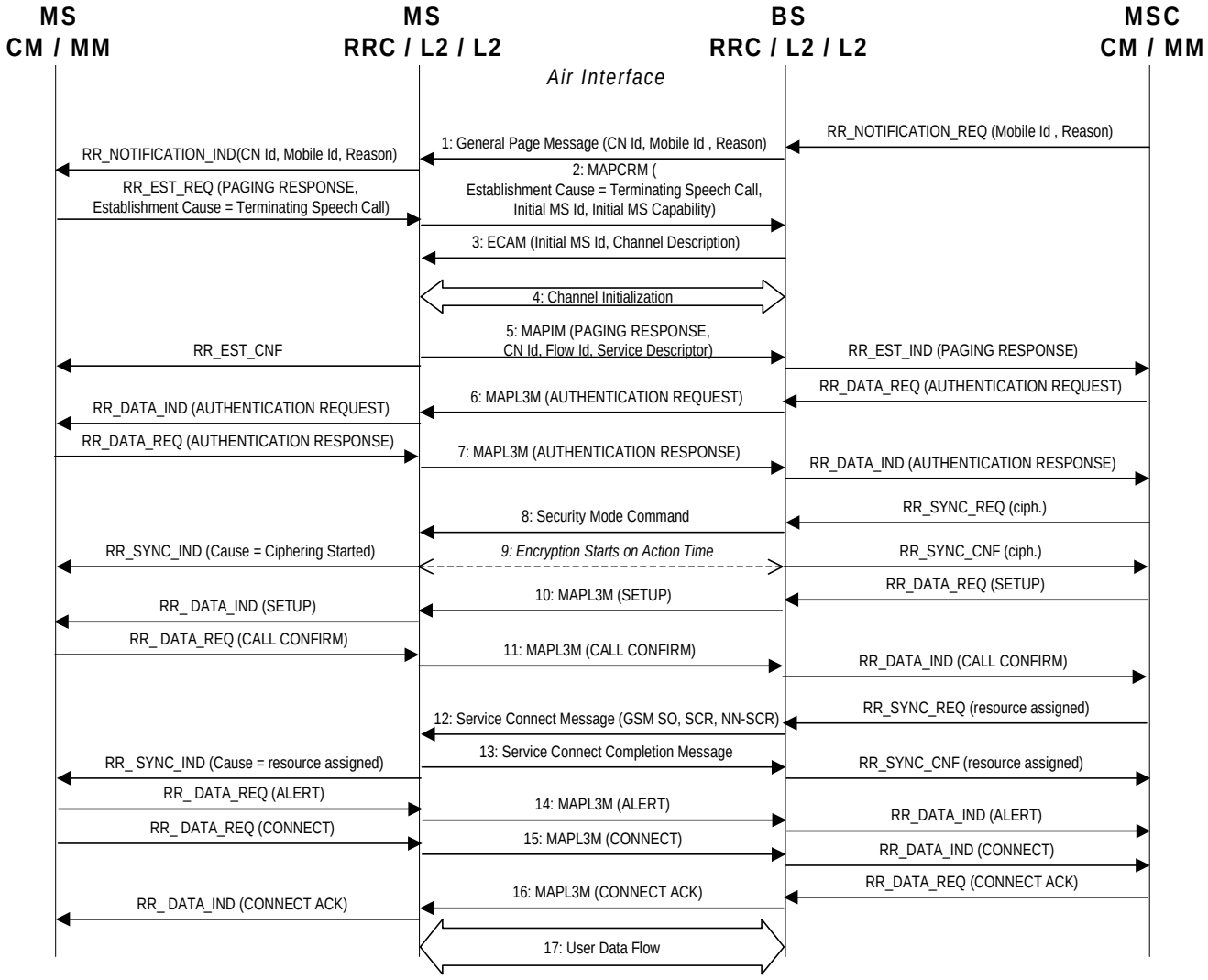

Figure 6.9.3-1. Example Mobile Terminated Call Setup Message Flow

6.9.4 Mobile Originated Call Release

Figure 6.9.4-1 shows example message flow of mobile originated call release.

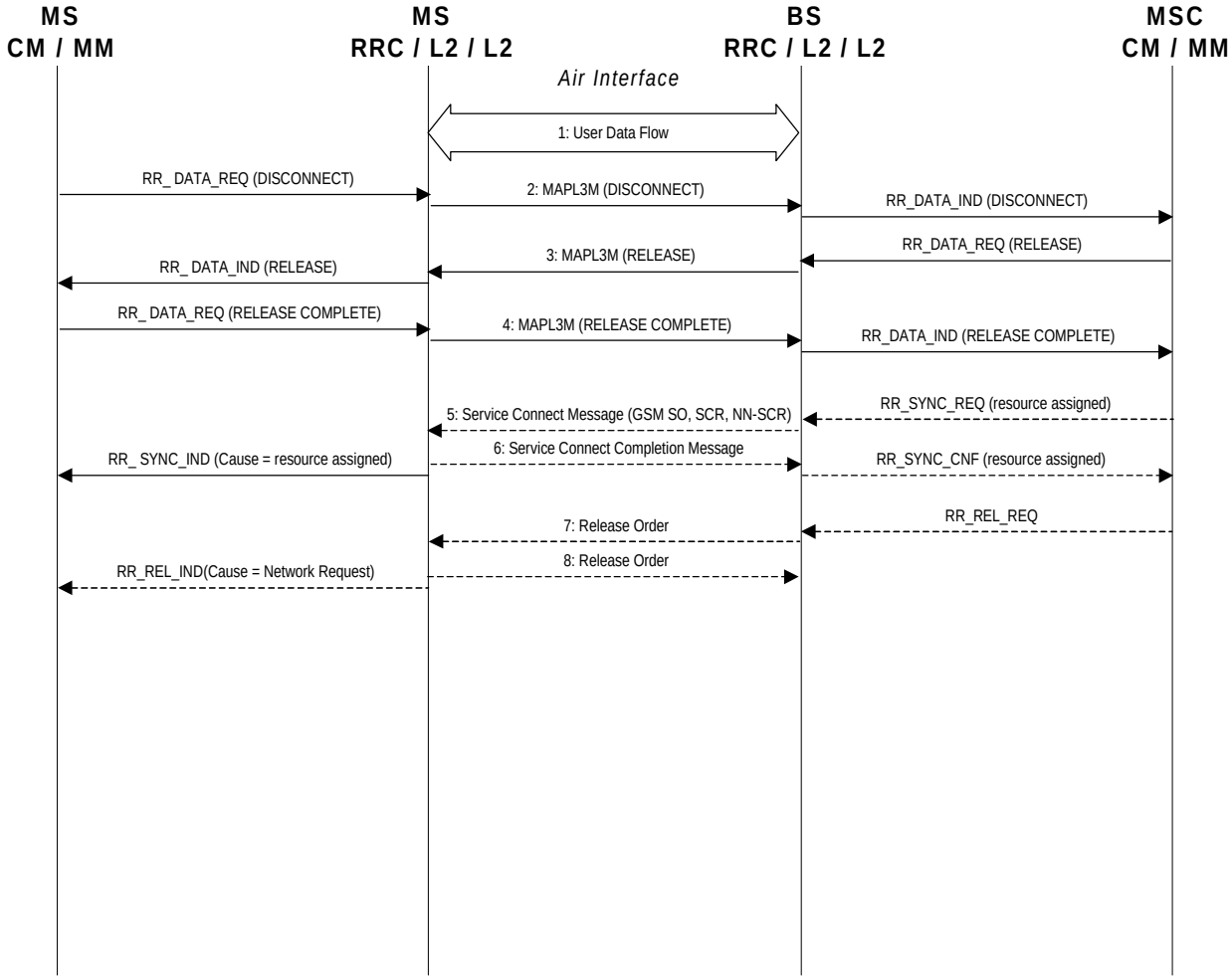

Figure 6.9.4-1. Example Mobile Originated Call Release Message Flow

See Annex B of 3GPP2 C.S0005-A for the use of the *Service Connect Message* and *Release Order*.

6.9.5 MC-MAP to MC-MAP Hard Handoff

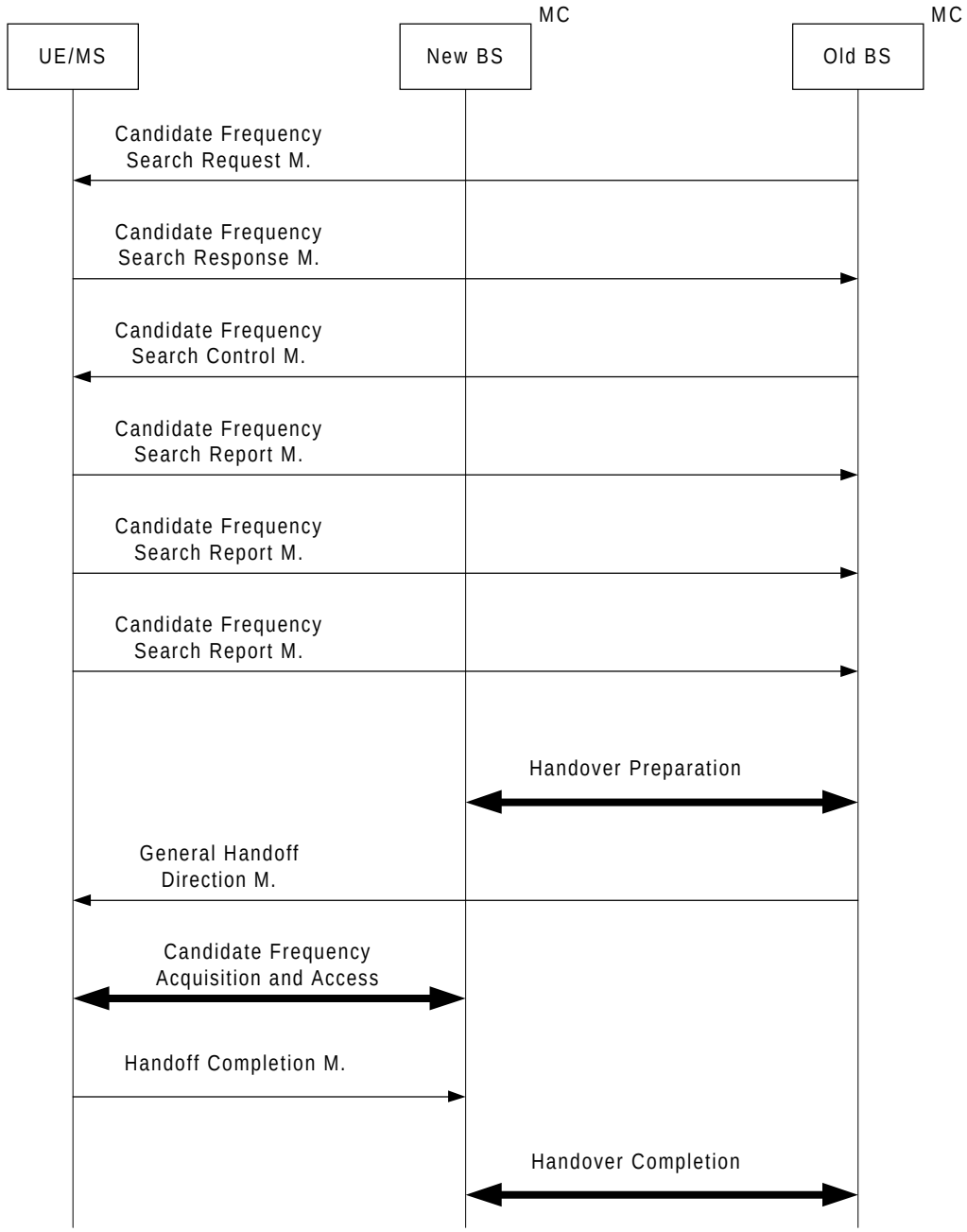

Figure 6.9.5-1. MC-MAP to MC-MAP Hard Handoff

6.9.6 Inter-system MC-MAP to GSM Handoff

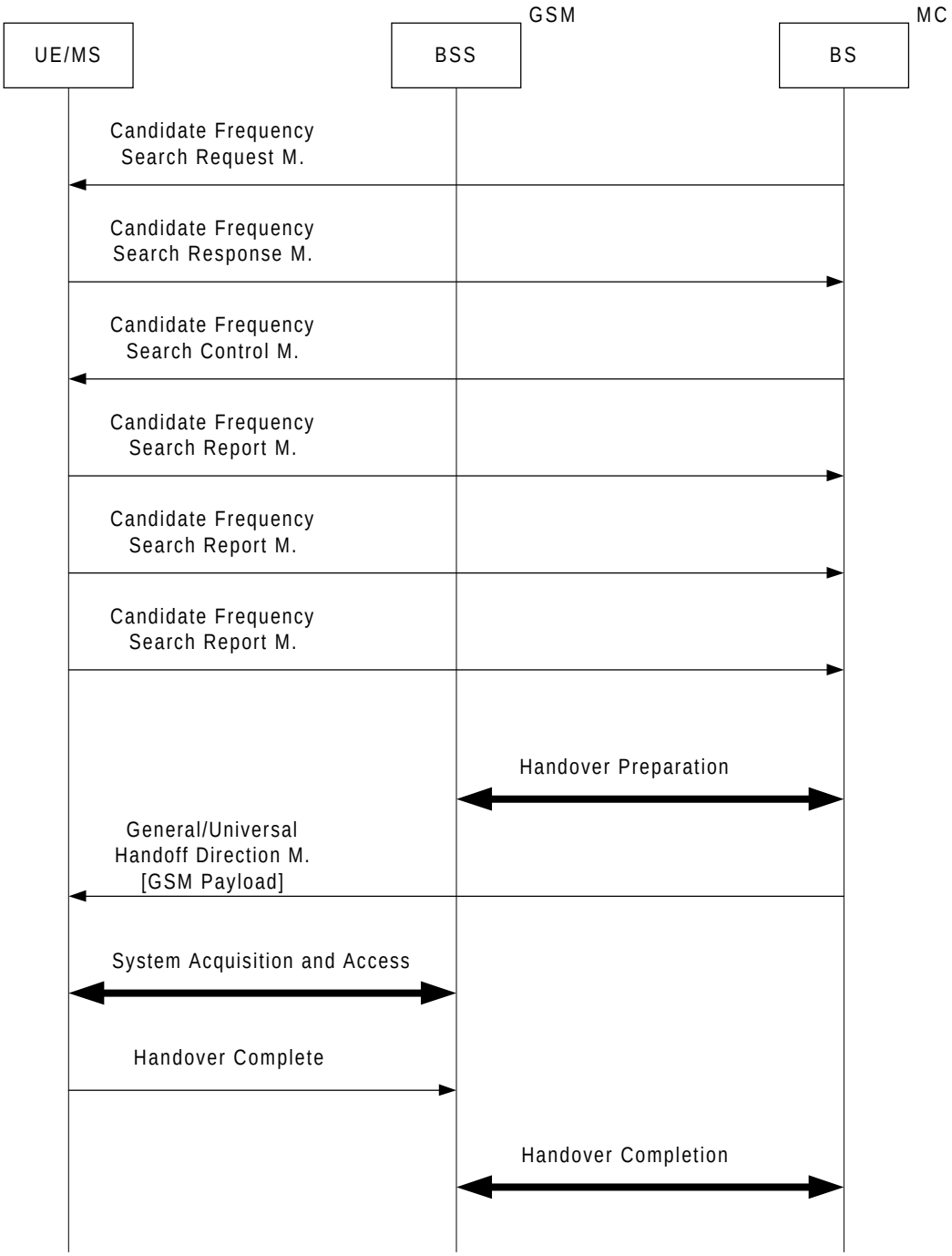

Figure 6.9.6-1. Inter-system MC-MAP to GSM Handoff

6.9.7 Inter-system GSM to MC-MAP Handoff

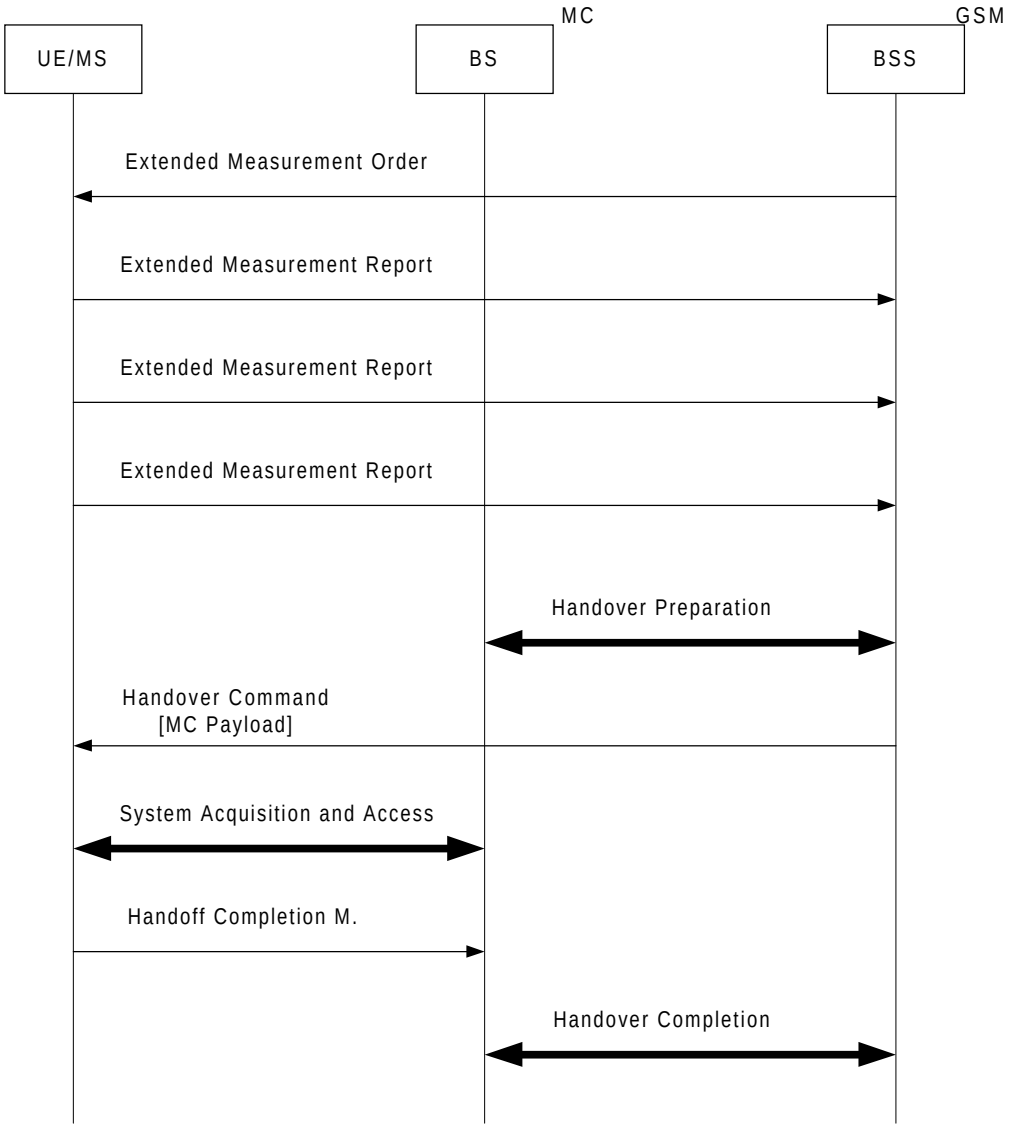

Figure 6.9.7-1. Inter-system GSM to MC-MAP Handoff

6.9.8 Inter-system MC-MAP to DS-MAP Handoff

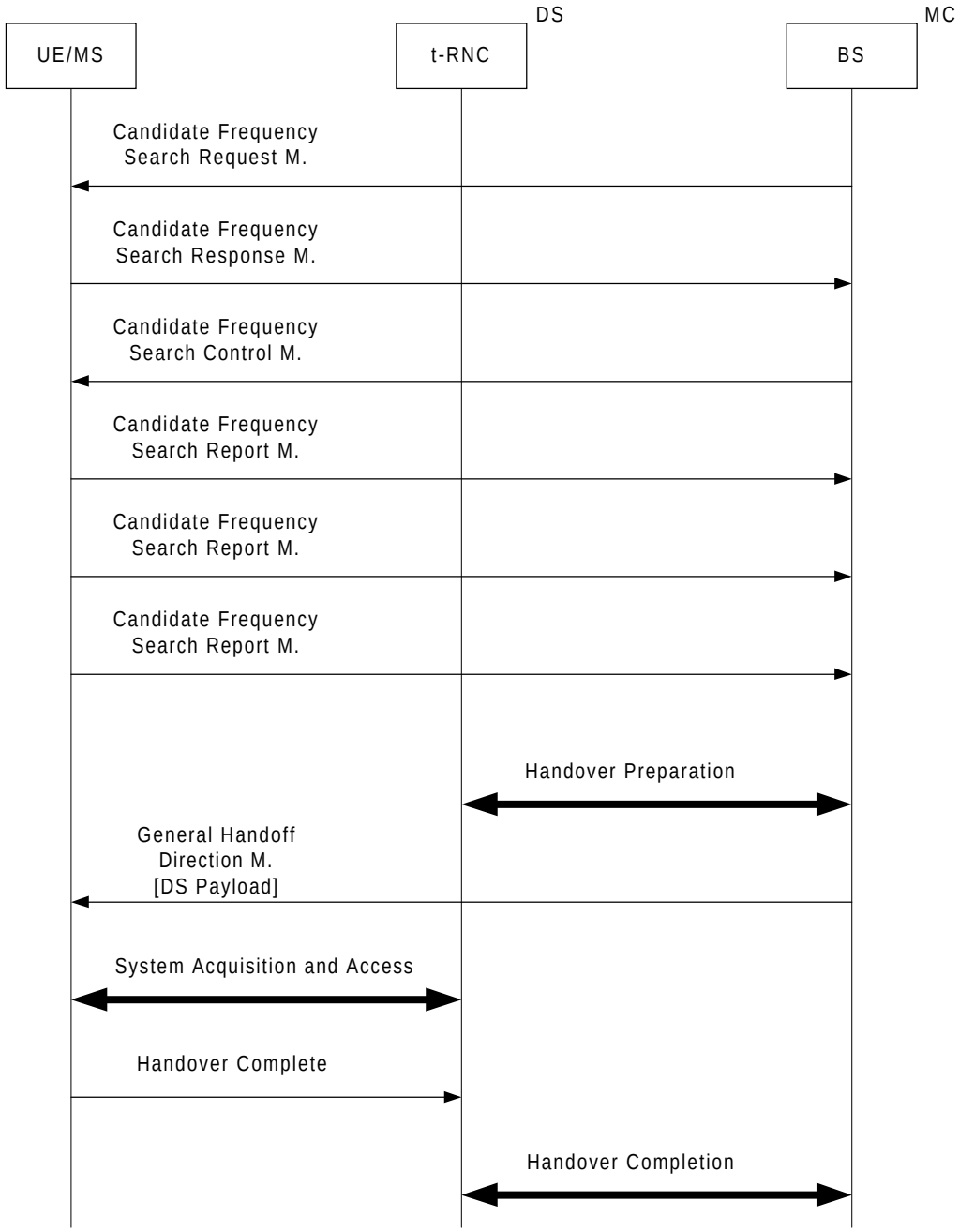

Figure 6.9.8-1. Inter-system MC-MAP to DS-MAP Handoff

6.9.9 Inter-system DS-MAP to MC-MAP Handoff

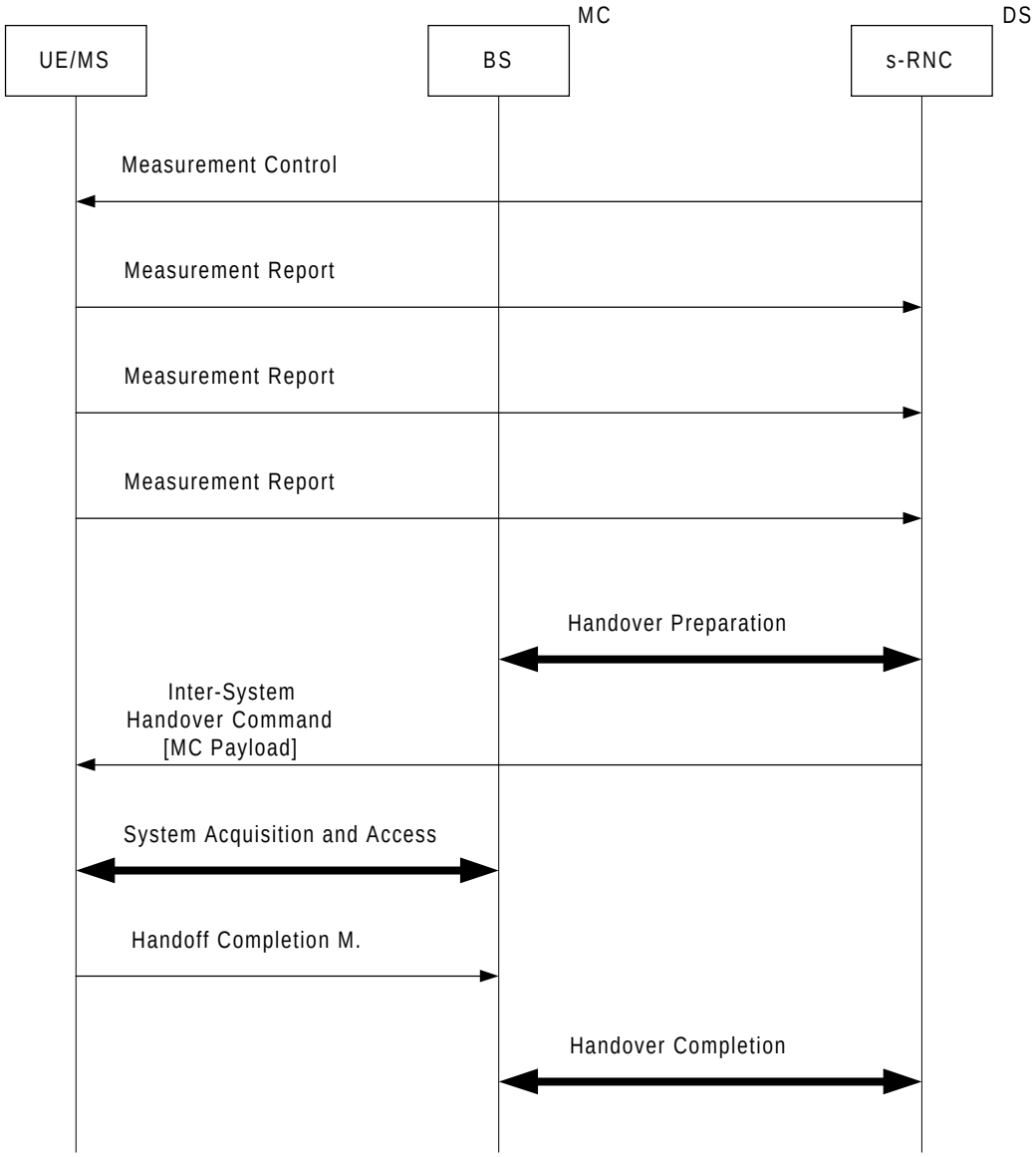

Figure 6.9.9-1. Inter-system DS-MAP to MC-MAP Handoff