3GPP TSG-CN Meeting #24　　　　　　　　　　　　　　　　**NP-040203**
2nd – 4th June 2004. Seoul, Korea.

Source:　　　**TSG CN WG 1**

Title:　　　**CRs to Rel-6 on Work Item TEI6 towards 24.008, 29.018 and 43.068**

Agenda item:　　**9.21**

Document for:　　**APPROVAL**

Introduction:

This document contains **5** CRs, **Rel-6** Work Item **"TEI6"**, that have been agreed by **TSG CN WG1 in CN1#34 meeting**, and are forwarded to TSG CN Plenary meeting #24 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Doc-2nd-Level
24.008	869	1	Rel-6	Introduction of Flexible Layer One Iu capability	B	6.4.0	N1-040985
24.008	871	2	Rel-6	Identity request for identity that is not available	F	6.4.0	N1-041098
24.008	882	1	Rel-6	Follow-on proceed for the PS domain	B	6.4.0	N1-041078
29.018	041	2	Rel-6	Addition of IMEISV to Update Location Procedure for ADD function	B	5.5.0	N1-040920
43.068	016	1	Rel-6	Correction of PCH re-organization notification	F	6.0.0	N1-041073

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CHANGE REQUEST

⌘   **43.068** CR **016**   ⌘**rev** **1** ⌘   Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Correction of PCH re-organization notification
Source: ⌘	Motorola

Work item code: ⌘	TEI6	***Date:*** ⌘	3/3/2004

Category: ⌘ **F**   ***Release:*** ⌘ Rel-6

Use one of the following categories:	Use one of the following releases:
F *(correction)*	2 *(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	R96 *(Release 1996)*
B *(addition of feature),*	R97 *(Release 1997)*
C *(functional modification of feature)*	R98 *(Release 1998)*
D *(editorial modification)*	R99 *(Release 1999)*
Detailed explanations of the above categories can	Rel-4 *(Release 4)*
be found in 3GPP TR 21.900.	Rel-5 *(Release 5)*
	Rel-6 *(Release 6)*

Reason for change: ⌘	In 3GPP TS 43.068 clause 11.3.1.3 c), it is stated that BSS shall inform the mobile station via FACCH that PCH re-organization occurred.
	But according to 3GPP TS 44.018, BSS uses System Information Type 6 via SACCH to inform PCH re-organization.
	We believe there is a type error in 43.068 by saying FACCH.
Summary of change: ⌘	Correct the type error in 43.068 clause 11.3.1.3 c)
Consequences if not approved: ⌘	Type error as well as mis-match between specifications remains.

Clauses affected: ⌘	Clause 11.3.1.3 c)

	Y	N		
Other specs affected: ⌘		X	Other core specifications ⌘	
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘	

**** First Modified Section ****

c) Paging into on-going voice group calls

Paging into on-going voice group calls shall be provided as an implementation option.

In addition to establishing the links for the voice group call, the network can provide paging information into on-going voice group calls informing mobile stations partaking in a voice group call of new incoming point-to-point calls.

The mobile station shall be ready to receive a paging message on the FACCH containing the mobile subscriber identity and the priority level if eMLPP applies.

The mechanism for the MSC to select the group calls to be paged as well as the mechanism for the MSC to inform the concerned BSS of paged group calls is still for further study.

In the event of a reorganisation of the PCH the BSS shall inform the mobile stations via the SFACCH that paging reorganisation has occurred. A mobile station receiving this indication shall decode the BCCH in order to obtain the new paging configuration.

**** End of Modified Section ****

CR-Form-v7

CHANGE REQUEST

⌘   **29.018 CR 041**   ⌘**rev 2** ⌘   Current version: **5.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐ Radio Access Network ☐   Core Network **X**

Title: ⌘	Addition of IMEISV to Update Location Procedure for ADD function
Source: ⌘	Ericsson

Work item code: ⌘	TEI6	**Date:** ⌘	03/05/2004

Category: ⌘ **B**	**Release:** ⌘ Rel-6

Use <u>one</u> of the following categories:
  F *(correction)*
  A *(corresponds to a correction in an earlier release)*
  B *(addition of feature),*
  C *(functional modification of feature)*
  D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
  2   *(GSM Phase 2)*
  R96   *(Release 1996)*
  R97   *(Release 1997)*
  R98   *(Release 1998)*
  R99   *(Release 1999)*
  Rel-4 *(Release 4)*
  Rel-5 *(Release 5)*
  Rel-6 *(Release 6)*

Reason for change: ⌘	This CR ensures that the Automatic Device Detection feature is fully supported in the network when the Gs interface is present. ADD function requires that the HLR be always updated with the IMEISV at Location Update procedure and if the subscriber later changes terminal. It is necessary to pass the IMEISV from the SGSN to the MSC/VLR at the earliest opportunity, e.g. at location update. Automatic Device Detection function in general works independent in CS and PS domains. The only exception to this is when a network is configured to use Gs. Then an issue may arise as described in the scenario below. The scenario is this: <u>NOM I, i.e. Gs active</u> - Class A terminals (non-GPRS) will register to VLR, which will update HLR - Class B & C terminals (GPRS) will register to SGSN, which will update HLR A user has a class A (non-GPRS) terminal, changes to a class B (GPRS) terminal, and then back to the class A (non-GPRS) terminal. The HLR will then first be updated from the VLR with the "old" IMEISV from the class A terminal (old IMEISV stored in VLR). The new class B terminal will then register to the SGSN and hence HLR will be updated with the "new" IMEISV from SGSN ("new" IMEISV stored in SGSN, "old" IMEISV still stored in VLR). When changed back to class A terminal, it will register to VLR again. VLR will compare the IMEISV from the class A terminal with its stored "old" IMEISV and find no difference. Result: "new" IMEISV in HLR, and "old" IMEISV in VLR and terminal, that is, *wrong* IMEISV in HLR.

	For NOM II networks the issue does not exist:
	<u>NOM II, i.e. Gs not active</u>.
	- All terminals (except class C) will register to VLR
	- VLR will retrieve and store IMEISV and update HLR when it changes
	A user has a class A (non-GPRS) terminal, changes to a class B (GPRS) terminal, and then back to the class A (non-GPRS) terminal.
	The HLR will be updated from the VLR both from the class A terminal *and* from the new class B terminal. The VLR will therefore be aware of all changes, and hence the HLR will be always be updated with the *correct* IMEISV. If the SGSN is also ADD capable, the HLR will be updated with the same IMEISV from both the VLR and the SGSN for the class B terminal.
	Updating VLR with IMEISV over Gs interface will handle the situation in NOM I networks. The IMEISV is already today sent over Gs for the purposes of Early UE, hence the protocol is already in place.
Summary of change: ⌘	IMEISV added to the Gs interface in the BSSAP+ Location Update Request message.
	The location update for non-GPRS service procedure is updated to mandate the SGSN to include the IMEISV information element in the BSSAP+-LOCATION-UPDATE-REQUEST message when the ADD feature is supported. Additionally, a reference to 22.101 has been added.
Consequences if ⌘ ***not approved:***	Function will not be in compliance with the stage 2, i.e. the ADD function will not be fully supported in the network when the Gs i/f is used, terminals can end up in a situation where the Ue has changed from GPRS to CS and no configuration update from the HLR will occur.

Clauses affected: ⌘	2.1, 6.2.1, 17.1.11.6			
	Y	**N**		
Other specs ⌘	**X**		Other core specifications ⌘	23.012 CR 015, 23.060 CR 494, 23.008 CR 130, 29.060 CR 488, 29.002 CR 718
affected:		**X**	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

```
                          First modification
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2.1   Normative references

[1]   [Void]

[1a]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   [Void]

[3]   [Void]

[4]   3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".

[5]   3GPP TS 23.003: "Numbering, addressing and identification".

[6]   3GPP TS 23.007: "Restoration procedures".

[6a]   3GPP TS 23.018: "Basic Call Handling; Technical realization".

[7]   3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

[8]   3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[9]   3GPP TS 43.064: "Overall description of the GPRS radio interface; Stage 2".

[10]   3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[11]   3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[11a]   3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[12]   3GPP TS 44.064: "Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[13]   3GPP TS 44.065: "Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[14]   3GPP TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".

[15]   3GPP TS 48.018: "Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[16]   3GPP TS 48.060: "Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."

[17]   3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[18]   3GPP TS 49.008: "Application of the Base Station System Application Part (BSSAP) on the E-interface".

[19]   3GPP TS 29.010: "Information Element Mapping between Mobile Station - Base Station System (MS-BSS) and Base Station System - Mobile-services Switching Centre (BSS-MCS) Signalling Procedures and the Mobile Application Part (MAP)".

[20]   3GPP TS 29.016: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service specification".

[21]   ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[22]   3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

[23]   3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".

[xx]	3GPP TS 22.101: "Service Principles".

Next modification

## 6.2.1	Location Update Initiation

If timer T6-1 is not running, the SGSN shall start the Location Update for non-GPRS service procedure when it receives from the MS:

- an Attach request indicating combined IMSI and GPRS attach;

- an Attach request indicating GPRS attach while IMSI attached;

- a Combined Routeing and Location Area Update request indicating IMSI attach;

- a Combined Routeing and Location Area Update request indicating that the Location Area has changed;

- a Combined Routeing and Location Area Update request, if the state of the association is Gs-NULL; or

- a Combined Routeing and Location Area Update request when the SGSN serving the MS has changed.

For networks not supporting the feature 'Intra Domain Connection of RAN Nodes to Multiple CN Nodes' the number of the VLR is derived from the RAI where the MS is camping. For networks supporting the feature 'Intra Domain Connection of RAN Nodes to Multiple CN Nodes', the VLR number is derived as described in 3GPP TS 23.236 [23]. The SGSN starts Timer T6-1. The BSSAP+-LOCATION-UPDATE-REQUEST message includes the old Location Area Identifier received from the MS. The SGSN shall also include the new Location Area Identifier where the MS is currently camping. The new LAI is derived from the RAI.

The BSSAP+-LOCATION-UPDATE-REQUEST message includes the type of location update performed by the MS in the GPRS location update type IE. If the MS has performed a combined attach request or a combined routing and location area update request with IMSI attach, the SGSN indicates 'IMSI attach', otherwise the SGSN indicates 'Normal location update'.

The BSSAP+-LOCATION-UPDATE-REQUEST message shall include the TMSI status if received from the MS.

If the SGSN supports the "Provision of UE Specific Behaviour Information to Network Entities" (see 3GPP TS 23.195 [23]) or the "Automatic Device Detection" (see 3GPP TS 22.101 [xx]), the BSSAP+-LOCATION-UPDATE-REQUEST message shall include the IMEISV.

If timer T6-1 is running:

> If the SGSN receives from the MS:

- an Attach request indicating combined IMSI and GPRS attach;

- an Attach request indicating GPRS attach while IMSI attached; or

- a Combined Routeing and Location Area Update request with or without IMSI attach.

> Then:

- if the new LAI is the same as in the outstanding request, the SGSN shall not process this new request and shall wait for the VLR's response to the ongoing procedure; or

- if the new LAI is different but is in the same VLR as the outstanding request:

    - any response from the VLR to the oustanding request is ignored;

    - Timer T6-1 shall be stopped and reset; and

    - The SGSN shall start the Location Update for non-GPRS service procedure; or

- if the new LAI is different, and is in a different VLR to the outstanding request:

  - any response from the previously addressed VLR to the oustanding request is ignored;

  - Timer T6-1 shall be stopped and reset; and

  - the SGSN shall start the Location Update for non-GPRS service procedure.

When the SGSN receives from the MS a Routeing Area Update request and the SGSN serving the MS has changed, the SGSN shall stop and reset timer T6-1.

Next modification

17.1.11 BSSAP+-LOCATION-UPDATE-REQUEST message

This message is sent by the SGSN to the VLR either to request update of its location file (normal update) or to request IMSI attach.

Table 17.1.11/3GPP TS 29.018: BSSAP+-LOCATION-UPDATE-REQUEST message content

Information Element	Type/Reference	Presence	Format	Length
Message type	Message type 18.2	M	V	1
IMSI	IMSI 18.4.10	M	TLV	6-10
SGSN number	SGSN number 18.4.22	M	TLV	5-11
Update type	GPRS location update type 18.4.6	M	TLV	3
New Cell global identity	Cell global identity 18.4.1	M	TLV	10
Mobile station classmark	Mobile station classmark 1 18.4.18	M	TLV	3
Old location area identifier	Location area identifier 18.4.14	O	TLV	7
TMSI status	TMSI status 18.4.24	O	TLV	3
New service area identification	Service area identification 18.4.21b	O	TLV	9
IMEISV	IMEISV 18.4.9	O	TLV	10

17.1.11.1 Old location area identifier

This information element should be included. It is derived from the old routing area identification received in the ROUTING AREA UPDATING REQUEST message defined in 3GPP TS 24.008.

17.1.11.2 New cell global identity

In A/Gb mode, the cell global identity which shall be included is the one where the MS is in the current radio contact.

In Iu mode, the cell global identity which shall be included indicates where the MS is in the current location area. The cell identity part of this information shall be ignored by the VLR.

17.1.11.3 TMSI status

This information element shall be included if the TMSI status received in the ATTACH REQUEST or ROUTING AREA UPDATING REQUEST message from the MS indicates, that no valid TMSI is available in the MS.

17.1.11.4 Mobile station classmark

This information element does not serve any useful purpose, but shall be included for reasons of compatibility with earlier versions of the protocol. To ease interworking with old VLR equipment, the SGSN shall encode the contents of this information element as: revision level 'GSM phase 2', 'early classmark sending supported', 'encryption algorithm A5/1 supported', and RF power capability 'class 1'.

17.1.11.5 New service area identification

In Iu mode, the service area identification which should be included is the one where the MS is in the current radio contact.

17.1.11.6 IMEISV

This information element shall be included, if the SGSN supports the "Provision of UE Specific Behaviour Information to Network Entities" or the "Automatic Device Detection".

Modification end

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CHANGE REQUEST

| | ⌘ | **24.008** CR **869** | ⌘ **rev** **1** | ⌘ | Current version: | **6.4.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Introduction of Flexible Layer One Iu capability
Source:	⌘	NOKIA, Siemens AG, Infineon AG
Work item code: ⌘	TEI-6	***Date:*** ⌘ 21/04/2004

Category:	⌘ **B**	***Release:*** ⌘ Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4   (Release 4)
Rel-5   (Release 5)
Rel-6   (Release 6)

Reason for change:	⌘	- Introduction of Flexible Layer One capability for GERAN Iu mode capable MSs in MS RAC and CM3 - A semicolumn is wrongly placed at the end of Rel-5 additions, instead of the end of Rel-6 additions
Summary of change: ⌘		- FLO capability bit is added within the GERAN Iu mode capability in MS RAC and CM3 - The semicolumn is put at the right place, end of Rel-6 additions
Consequences if not approved:	⌘	- It is not possible to indicate the support of FLO for GERAN Iu mode capable MSs - CSN.1 error leading to the impossibility to decode Rel-6 capabilities

Clauses affected:	⌘	10.5.1.7; 10.5.5.12a

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	This CR assumes that the CR to Rel-5 for allowing the indication of Iu mode specific capabilites conditionally to the support of Iu mode is agreed. Both CRs need to be approved or rejected together.

10.5.1.7   Mobile Station Classmark 3

The purpose of the *Mobile Station Classmark 3* information element is to provide the network with information concerning aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station. The Mobile Station Classmark information indicates general mobile station characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The *MS Classmark 3* is a type 4 information element with a maximum of 14 octets length.

The value part of a *MS Classmark 3* information element is coded as shown in figure 10.5.7/3GPP TS 24.008 and table 10.5.7/3GPP TS 24.008.

NOTE: The 14 octet limit is so that the CLASSMARK CHANGE message will fit in one layer 2 frame.

SEMANTIC RULE: a multiband mobile station shall provide information about all frequency bands it can support. A single band mobile station shall not indicate the band it supports in the *Multiband Supported, GSM 400 Bands Supported, GSM 700 Associated Radio Capability, GSM 850 Associated Radio Capability or GSM 1900 Associated Radio Capability* fields in the MS Classmark 3. Due to shared radio frequency channel numbers between GSM 1800 and GSM 1900, the mobile should indicate support for either GSM 1800 band OR GSM 1900 band.

SEMANTIC RULE: a mobile station shall include the MS Measurement Capability field if the *Multi Slot Class* field contains a value of 19 or greater (see 3GPP TS 45.002 [32]).

Typically, the number of spare bits at the end is the minimum to reach an octet boundary. The receiver may add any number of bits set to "0" at the end of the received string if needed for correct decoding.

```
<Classmark 3 Value part> ::=
    < spare bit >
    {   < Multiband supported : { 000 } >
            < A5 bits >
    |   < Multiband supported : { 101 | 110 } >
            < A5 bits >
            < Associated Radio Capability 2 : bit(4) >
            < Associated Radio Capability 1 : bit(4) >
    |   < Multiband supported : { 001 | 010 | 100 } >
            < A5 bits >
            < spare bit >(4)
            < Associated Radio Capability 1 : bit(4) > }
    { 0 | 1 < R Support > }
    { 0 | 1 < HSCSD Multi Slot Capability > }
    < UCS2 treatment: bit >
    < Extended Measurement Capability : bit >
    { 0 | 1 < MS measurement capability > }
    { 0 | 1 < MS Positioning Method Capability > }
    { 0 | 1 < ECSD Multi Slot Capability > }
    { 0 | 1 < ECSD Struct > }
    { 0 | 1 < GSM 400 Bands Supported : { 01 | 10 | 11 } >
            < GSM 400 Associated Radio Capability: bit(4) > }

    { 0 | 1 <GSM 850 Associated Radio Capability : bit(4) > }
    { 0 | 1 <GSM 1900 Associated Radio Capability : bit(4) > }
    < UMTS FDD Radio Access Technology Capability : bit >
    < UMTS 3.84 Mcps TDD Radio Access Technology Capability : bit >
    < CDMA 2000 Radio Access Technology Capability : bit >

    { 0 | 1  < DTM GPRS Multi Slot Class : bit(2) >
            < Single Slot DTM : bit >
            {0 | 1< DTM EGPRS Multi Slot Class : bit(2) > } }
    { 0 | 1 < Single Band Support > } -- Release 4 starts here:
    { 0 | 1 <GSM 700 Associated Radio Capability : bit(4)>}

    < UMTS 1.28 Mcps TDD Radio Access Technology Capability : bit >
    < GERAN Feature Package 1 : bit >

    { 0 | 1 < Extended DTM GPRS Multi Slot Class : bit(2) >
            < Extended DTM EGPRS Multi Slot Class : bit(2) > }

    { 0 | 1 < High Multislot Capability : bit(2) > }---Release 5 starts here.

    { 0 | 1 < GERAN Iu Mode Capabilities > }< GERAN Iu Mode Capability : bit >   -- '1' also means support of
GERAN Iu mode

    < GERAN Feature Package 2 : bit >

    < GMSK Multislot Power Profile : bit (2) >
    < 8-PSK Multislot Power Profile : bit (2) >

    { 0 | 1 < T-GSM 400 Bands Supported : { 01 | 10 | 11 } >
            < T-GSM 400 Associated Radio Capability: bit(4) > }

    { 0 | 1 < T-GSM 900 Associated Radio Capability: bit(4) > }

    < spare bit > ;

< A5 bits > ::=
    < A5/7 : bit > < A5/6 : bit > < A5/5 : bit > < A5/4 : bit >  ;

<R Support>::=
    < R-GSM band Associated Radio Capability : bit(3) > ;

< HSCSD Multi Slot Capability > ::=
```

```
            < HSCSD Multi Slot Class : bit(5) >  ;

< MS Measurement capability > ::=
    < SMS_VALUE : bit (4) >
    < SM_VALUE : bit (4) > ;

< MS Positioning Method Capability > ::=
    < MS Positioning Method : bit(5) > ;

< ECSD Multi Slot Capability > ::=
    < ECSD Multi Slot Class : bit(5) > ;

 < ECSD Struct> : :=
    < Modulation Capability : bit >
    { 0 | 1 < EDGE RF Power Capability 1: bit(2) > }
    { 0 | 1 < EDGE RF Power Capability 2: bit(2) > };

< Single Band Support > ::=
    < GSM Band : bit (4) > ;

< GERAN Iu Mode Capabilities > ::=
    < Length : bit (4) >         -- length in bits of Iu mode only capabilities and spare bits
-- Additions in release 6
    < FLO Iu Capability : bit >
    <spare bits>** ;        -- expands to the indicated length
                            -- may be used for future enhancements
```

Figure 10.5.7/3GPP TS 24.008 *Mobile Station Classmark 3* information element

Table 10.5.7/3GPP TS 24.008: *Mobile Station Classmark 3* information element

Multiband Supported (3 bit field)

Band 1 supported
Bit 1
   0   P-GSM not supported
   1   P-GSM supported

Band 2 supported
Bit 2
   0   E-GSM or R-GSM not supported
   1   E-GSM or R-GSM supported

Band 3 supported
Bit 3
   0   GSM 1800 not supported
   1   GSM 1800 supported

The indication of support of P-GSM band or E-GSM or R-GSM band is mutually exclusive.

When the 'Band 2 supported' bit indicates support of E-GSM or R-GSM, the presence of the <R Support> field, see below, indicates if the E-GSM or R-GSM band is supported.

In this version of the protocol, the sender indicates in this field either none, one or two of these 3 bands supported.

For single band mobile station or a mobile station supporting none of the GSM 900 bands(P-GSM, E-GSM and R-GSM) and GSM 1800 bands, all bits are set to 0.

A5/4
   0   Encryption algorithm A5/4 not available
   1   Encryption algorithm A5/4 available

A5/5
   0   Encryption algorithm A5/5 not available
   1   Encryption algorithm A5/5 available

A5/6
   0   Encryption algorithm A5/6 not available
   1   Encryption algorithm A5/6 available

A5/7
   0   Encryption algorithm A5/7 not available
   1   Encryption algorithm A5/7 available

Associated Radio capability 1 and 2 (4 bit fields)

If either of P-GSM or E-GSM or R-GSM is supported, the radio capability 1 field indicates the radio capability for P-GSM, E-GSM or R-GSM, and the radio capability 2 field indicates the radio capability for GSM 1800 if supported, and is spare otherwise.

If none of P-GSM or E-GSM or R-GSM are supported, the radio capability 1 field indicates the radio capability for GSM 1800, and the radio capability 2 field is spare.

The radio capability contains the binary coding of the power class associated with the band indicated in multiband support bits (see 3GPP TS 45.005 [33]).

(continued...)

R-GSM band Associated Radio Capability (3 bit field)

In case where the R-GSM band is supported the R-GSM band associated radio capability field contains the binary coding of the power class associated (see 3GPP TS 45.005) (regardless of the number of GSM bands supported). A mobile station supporting the R-GSM band shall also when appropriate, (see 10.5.1.6) indicate its support in the 'FC' bit in the Mobile Station Classmark 2 information element.

NOTE: The coding of the power class for P-GSM, E-GSM, R-GSM and GSM 1800 in radio capability 1 and/or 2 is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

HSCSD Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots for HSCSD then the HSCSD Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

UCS2 treatment (1 bit field)

This information field indicates the likely treatment by the mobile station of UCS2 encoded character strings. If not included, the value 0 shall be assumed by the receiver.
    0   the ME has a preference for the default alphabet (defined in 3GPP TS 23.038 [8b]) over UCS2.
    1   the ME has no preference between the use of the default alphabet and the use of UCS2.

Extended Measurement Capability (1 bit field)

This bit indicates whether the mobile station supports 'Extended Measurements' or not
    0   the MS does not support Extended Measurements
    1   the MS supports Extended Measurements

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbour cell power measurement, and the switch from that radio channel to another radio channel.
Bits
    4 3 2 1
    0 0 0 0   1/4 timeslot (~144 microseconds)
    0 0 0 1   2/4 timeslot (~288 microseconds)
    0 0 1 0   3/4 timeslot (~433 microseconds)
     . . .
    1 1 1 1   16/4 timeslot (~2307 microseconds)

SM_VALUE (Switch-Measure) (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement.
Bits
    4 3 2 1
    0 0 0 0   1/4 timeslot (~144 microseconds)
    0 0 0 1   2/4 timeslot (~288 microseconds)
    0 0 1 0   3/4 timeslot (~433 microseconds)
     . . .
    1 1 1 1   16/4 timeslot (~2307 microseconds)

MS Positioning Method (5 bit field)
This field indicates the Positioning Method(s) supported by the mobile station for the provision of location services (LCS) via the CS domain in A-mode.
MS assisted E-OTD
Bit 5
    0   MS assisted E-OTD not supported
    1   MS assisted E-OTD supported

MS based E-OTD
Bit 4
   0   MS based E-OTD not supported
   1   MS based E-OTD supported

MS assisted GPS
Bit 3
   0   MS assisted GPS not supported
   1   MS assisted GPS supported

MS based GPS
Bit 2
   0   MS based GPS not supported
   1   MS based GPS supported

MS Conventional GPS
Bit 1
   0   conventional GPS not supported
   1   conventional GPS supported

ECSD Multi Slot class (5 bit field)

In case the **ECSD** MS supports the use of multiple timeslots and the number of supported time slots is different from number of time slots supported for GMSK then the **ECSD** Multi Slot class field is included and is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

Modulation Capability

The Modulation Capability field indicates the modulation scheme the MS supports in addition to GMSK.
   0   8-PSK supported for downlink reception only
   1   8-PSK supported for uplink transmission and downlink reception

EDGE RF Power Capability 1 (2 bit field)
If 8-PSK modulation is supported for both uplink and downlink, the **EDGE RF Power Capability 1** field indicates the radio capability for 8-PSK modulation in GSM 400, GSM 700, GSM 850 or GSM 900.

EDGE RF Power Capability 2 (2 bit field)
If 8-PSK modulation is supported for both uplink and downlink, the **EDGE RF Power Capability 2** field indicates the radio capability for 8-PSK modulation in GSM 1800 or GSM 1900 if supported, and is not included otherwise.

The respective **EDGE RF Power Capability 1** and **EDGE RF Power Capability 2** fields contain the following coding of the 8-PSK modulation power class (see 3GPP TS 45.005 [33]):
Bits   2 1
       0 0   Reserved
       0 1   Power class E1
       1 0   Power class E2
       1 1   Power class E3

GSM 400 Bands Supported (2 bit field)
See the semantic rule for the sending of this field.
Bits
    2 1
    0 1   GSM 480 supported, GSM 450 not supported
    1 0   GSM 450 supported, GSM 480 not supported
    1 1   GSM 450 supported, GSM 480 supported

GSM 400 Associated Radio Capability (4 bit field)
If either GSM 450 or GSM 480 or both is supported, the GSM 400 Associated Radio Capability field indicates the radio capability for GSM 450 and/or GSM 480.

The radio capability contains the binary coding of the power class associated with the band indicated in GSM 400 Bands Supported bits (see 3GPP TS 45.005 [33]).

NOTE: The coding of the power class for GSM 450 and GSM 480 in GSM 400 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

GSM 850 Associated Radio Capability (4 bit field)
See the semantic rule for the sending of this field.
This field indicates whether GSM 850 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 850 band (see 3GPP TS 45.005 [33]).

Note: the coding of the power class for GSM 850 in GSM 850 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

GSM 1900 Associated Radio Capability (4 bit field)
See the semantic rule for the sending of this field.
This field indicates whether GSM 1900 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 1900 band (see 3GPP TS 45.005 [33]).

Note: the coding of the power class for GSM 1900 in GSM 1900 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

UMTS FDD Radio Access Technology Capability (1 bit field)
   0   UMTS FDD not supported
   1   UMTS FDD supported

UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)
   0   UMTS 3.84 Mcps TDD not supported
   1   UMTS 3.84 Mcps TDD supported

CDMA 2000 Radio Access Technology Capability (1 bit field)
   0   CDMA2000 not supported
   1   CDMA2000 supported

DTM GPRS Multi Slot Class (2 bit field)
This field indicates the DTM GPRS multislot capabilities of the MS. It is coded as follows:
Bit
  2 1
  0 0   Unused. If received, the network shall interpret this as '01'
  0 1   Multislot class 5 supported
  1 0   Multislot class 9 supported
  1 1   Multislot class 11 supported

Single Slot DTM (1 bit field)
This field indicates whether the MS supports single slot DTM operation (see 3GPP TS 43.055 [87]). It is coded as follows:

   0   Single Slot DTM not supported
   1   Single Slot DTM supported

An MS indicating support for Extended DTM GPRS multislot class or Extended DTM EGPRS multislot class shall set this bit to '1'. The network may ignore the bit in this case.

DTM EGPRS Multi Slot Class (2 bit field)
This field indicates the DTM EGPRS multislot capabilities of the MS. This field shall be included only if the mobile station supports EGPRS DTM. This field is coded as the DTM GPRS Multi Slot Class field.

Single Band Support
This field shall be sent if the mobile station supports UMTS and one and only one GSM band with the exception of R-GSM; this field shall not be sent otherwise

GSM Band (4 bit field)
Bits
  4 3 2 1
  0 0 0 0   E-GSM is supported
  0 0 0 1   P-GSM is supported
  0 0 1 0   GSM 1800 is supported
  0 0 1 1   GSM 450 is supported
  0 1 0 0   GSM 480 is supported
  0 1 0 1   GSM 850 is supported
  0 1 1 0   GSM 1900 is supported
  0 1 1 1   GSM 700 is supported
All other values are reserved for future use.

NOTE: When this field is received, the associated RF power capability is found in Classmark 1 or 2.

GSM 700 Associated Radio Capability (4 bit field)

See the semantic rule for the sending of this field.
This field indicates whether GSM 700 band is supported and its associated radio capability.

The radio capability contains the binary coding of the power class associated with the GSM 700 band (see 3GPP TS 45.005 [33]).

NOTE: The coding of the power class for GSM 700 in GSM 700 Associated Radio Capability is different to that used in the Mobile Station Classmark 1 and Mobile Station Classmark 2 information elements.

UMTS 1.28 Mcps TDD Radio Access Technology Capability (1 bit field)
0   UMTS 1.28 Mcps TDD not supported
1   UMTS 1.28 Mcps TDD supported

GERAN Feature Package 1 (1 bit field)
This field indicates whether the MS supports the GERAN Feature Package 1 (see 3GPP TS 44.060). It is coded as follows:

0   GERAN feature package 1 not supported.
1   GERAN feature package 1 supported.

Extended DTM GPRS Multi Slot Class (2 bit field)
This field indicates the extended DTM GPRS multislot capabilities of the MS and shall be interpreted in conjunction with the DTM GPRS Multi Slot Class field. It is coded as follows, where 'DGMSC' denotes the DTM GPRS Multi Slot Class field:

DGMSC Bit 2 1	Bit 2 1	
0 0	0 0	Unused. If received, it shall be interpreted as '01 00'
0 0	0 1	Unused. If received, it shall be interpreted as '01 00'
0 0	1 0	Unused. If received, it shall be interpreted as '01 00'
0 0	1 1	Unused. If received, it shall be interpreted as '01 00'
0 1	0 0	Multislot class 5 supported
0 1	0 1	Multislot class 6 supported
0 1	1 0	Unused. If received, it shall be interpreted as '01 00'
0 1	1 1	Unused. If received, it shall be interpreted as '01 00'
1 0	0 0	Multislot class 9 supported
1 0	0 1	Multislot class 10 supported
1 0	1 0	Unused. If received, it shall be interpreted as '10 00'
1 0	1 1	Unused. If received, it shall be interpreted as '10 00'
1 1	0 0	Multislot class 11 supported
1 1	0 1	Unused. If received, it shall be interpreted as '11 00'
1 1	1 0	Unused. If received, it shall be interpreted as '11 00'
1 1	1 1	Unused. If received, it shall be interpreted as '11 00'

The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink.When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class field*.

Extended DTM EGPRS Multi Slot Class (2 bit field)
This field is not considered when the DTM EGPRS Multi Slot Class field is not included. This field indicates the extended DTM EGPRS multislot capabilities of the MS and shall be interpreted in conjunction with the DTM EGPRS Multi Slot Class field. This field is coded as the Extended DTM GPRS Multi Slot Class field. The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM EGPRS Multi Slot Class* field.

High Multislot Capability (2 bit field)
This field indicates the support of multislot classes 30 to 45, see 3GPP TS 45.002.
The High Multislot Capability is individually combined with each multislot class field sent by the MS (the possible multislot class fields are: HSCSD multislot class, ECSD multislot class, GPRS multislot class, EGPRS multislot class, DTM GPRS multislot class, DTM EGPRS multislot class, extended DTM GPRS multislot class and extended DTM EGPRS multislot class) to extend the related multislot class with the rule described in the MS Radio Access Capability IE.

GERAN Iu Mode Capabilities~~y~~ ~~(1 bit field)~~
This field indicates if the mobile station supports GERAN Iu mode. Furthermore, it indicates the GERAN Iu mode capabilities of the mobile station. The field shall be included if the mobile station supports GERAN Iu mode. If the field is not present, the mobile station does not support GERAN Iu mode.
~~Bit~~
~~0   GERAN Iu mode not supported~~
~~1   GERAN Iu mode supported~~

GERAN Feature Package 2 (1 bit field)
This field indicates the MS support of the GERAN Feature Package 2. The GERAN Feature Package 2 includes **Enhanced Power Control (EPC)** (see 3GPP TS 45.008).

    0   GERAN feature package 2 not supported.
    1   GERAN feature package 2 supported.

**** NEXT MODIFIED SECTION ****

10.5.5.12a   MS Radio Access capability

The purpose of the *MS RA capability* information element is to provide the radio part of the network with information concerning radio aspects of the mobile station. The contents might affect the manner in which the network handles the operation of the mobile station.

The *MS RA capability* is a type 4 information element, with a maximum length of 52 octets.

The value part of a *MS RA capability* information element is coded a shown table 10.5.146/3GPP TS 24.008.

For the indication of the radio access capabilities the following conditions shall apply:

- Among the three Access Type Technologies GSM 900-P, GSM 900-E and GSM 900-R only one shall be present.

- Due to shared radio frequency channel numbers between GSM 1800 and GSM 1900, the mobile station should provide the relevant radio access capability for either GSM 1800 band OR GSM 1900 band, not both.

- The MS shall indicate its supported Access Technology Types during a single MM procedure.

- If the alternative coding by using the Additional access technologies struct is chosen by the mobile station, the mobile station shall indicate its radio access capability for the serving BCCH frequency band in the first included Access capabilities struct, if this information element is not sent in response to an Access Technologies Request from the network or if none of the requested Access Technology Types is supported by the MS. Otherwise, the mobile station shall include the radio access capabilities for the frequency bands it supports in the order of priority requested by the network (see 3GPP TS 44.060).

- The first Access Technology Type shall not be set to "1111".

For error handling the following shall apply:

- If a received Access Technology Type is unknown to the receiver, it shall ignore all the corresponding fields.

- If within a known Access Technology Type a receiver recognizes an unknown field it shall ignore it.

- For more details about error handling of MS radio access capability see 3GPP TS 48.018 [86].

Table 10.5.146/3GPP TS 24.008: *Mobile Station Radio Access Capability* Information Element

<MS RA capability value part : < MS RA capability value part struct >>
<spare bits>**; -- *may be used for future enhancements*

<MS RA capability value part struct >::= --*recursive structure allows any number of Access technologies*
   { { < **Access Technology Type**: bit (4) > exclude 1111
          < **Access capabilities** : <Access capabilities struct> > }

   | { < **Access Technology Type**: bit (4) == 1111 >   -- *structure adding Access technologies with same capabilities*
          < **Length** : bit (7) >   -- *length in bits of list of Additional access technologies and spare bits*
          { 1 < **Additional access technologies**: < Additional access technologies struct > > } ** 0
          <spare bits>** } }

   { 0 | 1 <MS RA capability value part struct> } ;

< Additional access technologies struct > ::=
   < **Access Technology Type** : bit (4) >
   < **GMSK Power Class** : bit (3) >
   < **8PSK Power Class** : bit (2) > ;

< Access capabilities struct > ::=
   < **Length** : bit (7) > -- length in bits of Content and spare bits
   <Access capabilities : <Content>>
   <spare bits>** ; -- expands to the indicated length
           -- may be used for future enhancements

< Content > ::=
     < **RF Power Capability** : bit (3) >
   { 0 | 1 <**A5 bits** : <A5 bits> > }   -- *zero means that the same values apply for parameters as in the immediately preceding Access capabilities field within this IE*
   < **ES IND** : bit >
   < **PS** : bit >
   < **VGCS** : bit >
   < **VBS** : bit >
   { 0 | 1 < **Multislot capability** : Multislot capability struct > } -- *zero means that the same values for multislot parameters as given in an earlier Access capabilities field within this IE apply also here*
-- *Additions in release 99*
   { 0 | 1 < **8PSK Power Capability** : bit(2) >} -- *'1' also means 8PSK modulation capability in uplink.*
   < **COMPACT Interference Measurement Capability : bit >**
   < **Revision Level Indicator** : bit >
   < **UMTS FDD Radio Access Technology Capability** : bit >   -- *3G RAT*
   < **UMTS 3.84 Mcps TDD Radio Access Technology Capability** : bit > -- *3G RAT*
   < **CDMA 2000 Radio Access Technology Capability** : bit >   -- *3G RAT*
-- *Additions in release 4*
   < **UMTS 1.28 Mcps TDD Radio Access Technology Capability**: bit > -- *3G RAT*
   < **GERAN Feature Package 1** : bit >
   { 0 | 1 < **Extended DTM GPRS Multi Slot Class** : bit(2) >
          < **Extended DTM EGPRS Multi Slot Class** : bit(2) > }
   < Modulation based multislot class support : bit >
-- *Additions in release 5*
   { 0 | 1 < **High Multislot Capability** : bit(2) > }
   { 0 | 1 < **GERAN Iu Mode Capabilities** > } -- *'1' also means support of GERAN Iu mode* < **GERAN Iu Mode Capability : bit >**
   < **GMSK Multislot Power Profile** : bit (2) >
   < **8-PSK Multislot Power Profile** : bit (2) > ;
-- *Additions in release 6*
   < **Multiple TBF Capability** : bit > ;

-- error: struct too short, assume features do not exist
-- error: struct too long, ignore data and jump to next Access technology

< Multislot capability struct > ::=
    { 0 | 1 < **HSCSD multislot class** : bit (5) > }
    { 0 | 1 < **GPRS multislot class** : bit (5) > < **GPRS Extended Dynamic Allocation Capability** : bit > }
    { 0 | 1 < **SMS_VALUE** : bit (4) > < **SM_VALUE** : bit (4) > }
-- *Additions in release 99*
    { 0 | 1 < **ECSD multislot class** : bit (5) > }
    { 0 | 1 < **EGPRS multislot class** : bit (5) > < **EGPRS Extended Dynamic Allocation   Capability** : bit > }
    {0 | 1   < **DTM GPRS Multi Slot Class**: bit(2)>
        <Single Slot DTM : bit>
        {0 | 1 <**DTM EGPRS Multi Slot Class** : bit(2)> } } ;
    -- error: struct too short, assume features do not exist

< **GERAN Iu Mode Capabilities** > ::=
   < **Length** : bit (4) >   -- *length in bits of Iu mode-only capabilities and spare bits*
-- *Additions in release 6*
   < **FLO Iu Capability** : bit >
   <spare bits>** ;   -- *expands to the indicated length*
                        -- *may be used for future enhancements*

<A5 bits> ::= < A5/1 : bit> <A5/2 : bit> <A5/3 : bit> <A5/4 : bit> <A5/5 : bit> <A5/6 : bit> <A5/7 : bit>; -- bits for circuit mode ciphering algorithms. These fields are not used by the network and may be excluded by the MS.

Access Technology Type
This field indicates the access technology type to be associated with the following access capabilities.

Bits
4 3 2 1
0 0 0 0   GSM P
0 0 0 1   GSM E *--note that GSM E covers GSM P*
0 0 1 0   GSM R *--note that GSM R covers GSM E and GSM P*
0 0 1 1   GSM 1800
0 1 0 0   GSM 1900
0 1 0 1   GSM 450
0 1 1 0   GSM 480
0 1 1 1   GSM 850
1 0 0 0   GSM 700
1 0 0 1   GSM T 380
1 0 1 0   GSM T 410
1 0 1 1   GSM T 900
1 1 1 1   Indicates the presence of a list of Additional access technologies
All other values are treated as unknown by the receiver.

A MS which does not support any GSM access technology type shall set this field to '0000'.

RF Power Capability, GMSK Power Class (3 bit field)
This field contains the binary coding of the power class used for GMSK associated with the indicated Access Technology Type (see 3GPP TS 45.005).

A MS which does not support any GSM access technology type shall set this field to '000'.

8PSK Power Capability (2 bit field)
If 8-PSK modulation is supported for uplink, this field indicates the radio capability for 8-PSK modulation. The following coding is used (see 3GPP TS 45.005 [33]):
Bits   2 1
      0 0   Reserved
      0 1   Power class E1
      1 0   Power class E2
      1 1   Power class E3

8PSK Power Class (2 bit field)
This field indicates the radio capability for 8-PSK modulation. The following coding is used (see 3GPP TS 45.005):
Bits   2 1
      0 0   8PSK modulation not supported for uplink

```
        0 1     Power class E1
        1 0     Power class E2
        1 1     Power class E3
```

Additional access technologies struct
This structure contains the GMSK Power Class and 8PSK Power Class for an additional Access Technology. All
other capabilities for this indicated Access Technology are the same as the capabilities indicated by the preceding
Access capabilities struct.

A5/1
0   encryption algorithm A5/1 not available
1   encryption algorithm A5/1 available
A5/2
0   encryption algorithm A5/2 not available
1   encryption algorithm A5/2 available
A5/3
0   encryption algorithm A5/3 not available
1   encryption algorithm A5/3 available
A5/4
0   encryption algorithm A5/4 not available
1   encryption algorithm A5/4 available
A5/5
0   encryption algorithm A5/5 not available
1   encryption algorithm A5/5 available
A5/6
0   encryption algorithm A5/6 not available
1   encryption algorithm A5/6 available
A5/7
0   encryption algorithm A5/7 not available
1   encryption algorithm A5/7 available

ES IND – (Controlled early Classmark Sending)
0   "controlled early Classmark Sending" option is not implemented
1   "controlled early Classmark Sending" option is implemented

PS – (Pseudo Synchronisation)
0   PS capability not present
1   PS capability present

VGCS – (Voice Group Call Service)
0   no VGCS capability or no notifications wanted
1   VGCS capability and notifications wanted.

VBS – (Voice Broadcast Service)
0   no VBS capability or no notifications wanted
1   VBS capability and notifications wanted

HSCSD Multi Slot Class
The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].
This field is not used by the network and may be excluded by the MS.
Range 1 to 18, all other values are reserved.

GPRS Multi Slot Class
The GPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

ECSD Multi Slot Class
The presence of this field indicates ECSD capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32]. This field is not used by the network and may be excluded by the MS.
Range 1 to 18, all other values are reserved.

EGPRS Multi Slot Class
The presence of this field indicates EGPRS capability. Whether the MS is capable of 8-PSK modulation in uplink is indicated by the presence of 8-PSK Power Capability field. The EGPRS Multi Slot Class field is coded as the binary representation of the multislot class defined in 3GPP TS 45.002 [32].

GPRS Extended Dynamic Allocation Capability
0   Extended Dynamic Allocation Capability for GPRS is not implemented
1   Extended Dynamic Allocation Capability for GPRS is implemented

EGPRS Extended Dynamic Allocation Capability
0   Extended Dynamic Allocation Capability for EGPRS is not implemented
1   Extended Dynamic Allocation Capability for EGPRS is implemented

SMS_VALUE (Switch-Measure-Switch) (4 bit field)
The SMS field indicates the time needed for the mobile station to switch from one radio channel to another, perform a neighbor cell power measurement, and the switch from that radio channel to another radio channel. This field is not used by the network and may be excluded by the MS.
Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

(SM_VALUE) Switch-Measure (4 bit field)
The SM field indicates the time needed for the mobile station to switch from one radio channel to another and perform a neighbour cell power measurement. This field is not used by the network and may be excluded by the MS.
Bits
4 3 2 1
0 0 0 0   1/4 timeslot (~144 microseconds)
0 0 0 1   2/4 timeslot (~288 microseconds)
0 0 1 0   3/4 timeslot (~433 microseconds)
 . . .
1 1 1 1   16/4 timeslot (~2307 microseconds)

DTM GPRS Multi Slot Class (2 bit field)
This field indicates the DTM GPRS multislot capabilities of the MS. It is coded as follows:
Bits
2 1
0 0   Unused. If received, the network shall interpret this as '01'
0 1   Multislot class 5 supported
1 0   Multislot class 9 supported
1 1   Multislot class 11 supported

Single Slot DTM (1 bit field)
This field indicates whether the MS supports single slot DTM operation (see 3GPP TS 43.055 [87]).
Bit
0   Single Slot DTM not supported
1   Single Slot DTM supported

An MS indicating support for Extended DTM GPRS multislot class or Extended DTM EGPRS multislot class shall set this bit to '1'. The network may ignore the bit in this case.

DTM EGPRS Multi Slot Class (2 bit field)
This field indicates the DTM EGPRS multislot capabilities of the MS. This field shall be included only if the mobile station supports EGPRS DTM. This field is coded as the DTM GPRS multislot Class field.

COMPACT Interference Measurement Capability (1 bit field)
0   COMPACT Interference Measurement Capability is not implemented
1   COMPACT Interference Measurement Capability is implemented

Revision Level Indicator (1 bit field)
Bit
0   The ME is Release '98 or older
1   The ME is Release '99 onwards

UMTS FDD Radio Access Technology Capability (1 bit field)
Bit
0   UMTS FDD not supported
1   UMTS FDD supported

UMTS 3.84 Mcps TDD Radio Access Technology Capability (1 bit field)
Bit
0   UMTS 3.84 Mcps TDD not supported
1   UMTS 3.84 Mcps TDD supported

CDMA 2000 Radio Access Technology Capability (1 bit field)
Bit
0   CDMA 2000 not supported
1   CDMA 2000 supported

UMTS 1.28 Mcps TDD Radio Access Technology Capability (1 bit field)
Bit
0   UMTS 1.28 Mcps TDD not supported
1   UMTS 1.28 Mcps TDD supported

GERAN Feature Package 1 (1 bit field)
This field indicates whether the MS supports the GERAN Feature Package 1 (see 3GPP TS 44.060). It is coded as follows:

0   GERAN feature package 1 not supported.
1   GERAN feature package 1 supported.

Extended DTM GPRS Multi Slot Class (2 bit field)
This field indicates the extended DTM GPRS capabilities of the MS and shall be interpreted in conjunction with the DTM GPRS Multi Slot Class field. It is coded as follows, where 'DGMSC' denotes the DTM GPRS multislot class field:

DGMSC Bit	2 1	**Bit 2 1**	
	0 0	**0 0**	Unused. If received, it shall be interpreted as '01 00'
	0 0	**0 1**	Unused. If received, it shall be interpreted as '01 00'

0 0	**1 0**	Unused. If received, it shall be interpreted as '01 00'	
0 0	**1 1**	Unused. If received, it shall be interpreted as '01 00'	
0 1	**0 0**	Multislot class 5 supported	
0 1	**0 1**	Multislot class 6 supported	
0 1	**1 0**	Unused. If received, it shall be interpreted as '01 00'	
0 1	**1 1**	Unused. If received, it shall be interpreted as '01 00'	
1 0	**0 0**	Multislot class 9 supported	
1 0	**0 1**	Multislot class 10 supported	
1 0	**1 0**	Unused. If received, it shall be interpreted as '10 00'	
1 0	**1 1**	Unused. If received, it shall be interpreted as '10 00'	
1 1	**0 0**	Multislot class 11 supported	
1 1	**0 1**	Unused. If received, it shall be interpreted as '11 00'	
1 1	**1 0**	Unused. If received, it shall be interpreted as '11 00'	
1 1	**1 1**	Unused. If received, it shall be interpreted as '11 00'	

The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the *DTM GPRS Multi Slot Class* field.

Extended DTM EGPRS Multislot Class (2 bit field)
This field is not considered when the DTM EGPRS Multislot Class field is not included. This field indicates the extended DTM EGPRS multislot capabilities of the MS and shall be interpreted in conjunction with the DTM EGPRS Multislot Class field. This field is coded as the Extended DTM GPRS Multislot Class field. The presence of this field indicates that the MS supports combined fullrate and halfrate GPRS channels in the downlink. When this field is not present, the MS supports the multislot class indicated by the DTM EGPRS Multi Slot Class field.

Modulation based multislot class support (1 bit field)
Bit
0   "Modulation based multislot class" not supported
1   "Modulation based multislot class" supported

High Multislot Capability (2 bit field)
The High Multislot Capability is individually combined with each multislot class field sent by the MS (the possible multislot class fields are: HSCSD multislot class, ECSD multislot class, GPRS multislot class, EGPRS multislot class, DTM GPRS multislot class, DTM EGPRS multislot class, extended DTM GPRS multislot class and extended DTM EGPRS multislot class) to extend the related multislot class to multislot classes 30 to 45, see
3GPP TS 45.002.
For each multislot class, the following mapping is done:
Bits
2 1   coded multislot class field   actual multislot class
0 0   8   30
0 0   10, 23, 28, 29   39
0 0   11, 20, 25   32
0 0   12, 21, 22, 26, 27   33
0 0   Any other   Multislot Class field value
0 1   8   35
0 1   10, 19, 24   36
0 1   11, 23, 28, 29   45
0 1   12, 21, 22, 26, 27   38
0 1   Any other   Multislot Class field value
1 0   8   40
1 0   10, 19, 24   41
1 0   11, 20, 25   42
1 0   12, 23, 28, 29   44
1 0   Any other   Multislot Class field value
1 1   12, 21, 22, 26, 27   43
1 1   11, 20, 25   37
1 1   10, 19, 24   31
1 1   9, 23, 28, 29   34
1 1   Any other   Multislot Class field value

GERAN Iu Mode Capabilit~~ies~~~~y~~ ~~(1 bit field)~~
This field indicates if the mobile station supports GERAN Iu mode. Furthermore, it indicates the GERAN Iu mode capabilities of the mobile station. The field shall be included if the mobile station supports GERAN Iu mode. If the field is not present, the mobile station does not support GERAN Iu mode.
~~Bit~~
~~0   GERAN Iu mode not supported~~

1   GERAN Iu mode supported

CR-Form-v7

CHANGE REQUEST

⌘   **24.008** CR **871**   ⌘**rev** **2** ⌘   Current version: **6.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network ☐   Core Network **X**

Title: ⌘	Identity request for identity that is not available	
Source: ⌘	Nokia, Siemens	
Work item code: ⌘	TEI-6	***Date:*** ⌘ 29/04/2004
Category: ⌘	**F**	***Release:*** ⌘ Rel-6

Use one of the following categories: *Use one of the following releases:*
F (correction)   *2   (GSM Phase 2)*
A (corresponds to a correction in an earlier release)   *R96   (Release 1996)*
B (addition of feature),   *R97   (Release 1997)*
C (functional modification of feature)   *R98   (Release 1998)*
D (editorial modification)   *R99   (Release 1999)*
Detailed explanations of the above categories can   *Rel-4   (Release 4)*
be found in 3GPP TR 21.900.   *Rel-5   (Release 5)*
                                               Rel-6   (Release 6)

Reason for change: ⌘	TS 24.008 does not specify how to behave when network requests by IDENTITY REQUEST an identity that UE does not have available. This could be the case when IMSI or TMSI is requested by the network during emergency call with no USIM or TMSI is requested when the UE has got no valid TMSI.
Summary of change: ⌘	If the network requests for an identity that is not available UE shall respond with identity type 'No identity'.
Consequences if not approved: ⌘	There are cases when the current UE requirements can not be implemented at all.

Clauses affected: ⌘	4.3.3.3, 4.7.8.3a (new), 10.5.1.4

		Y	N		
Other specs	⌘		X	Other core specifications	⌘
Affected:			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘	

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    downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.3.3 Identification procedure

The identification procedure is used by the network to request a mobile station to provide specific identification parameters to the network e.g. International Mobile Subscriber Identity, International Mobile Equipment Identity (see 3GPP TS 23.003 [10]). For the presentation of the IMEI, the requirements of 3GPP TS 42.009 [5] apply.

4.3.3.1 Identity request by the network

The network initiates the identification procedure by transferring an IDENTITY REQUEST message to the mobile station and starts the timer T3270. The IDENTITY REQUEST message specifies the requested identification parameters in the identity type information element.

4.3.3.2 Identification response by the mobile station

The mobile station shall be ready to respond to an IDENTITY REQUEST message at any time whilst a RR connection exists.

Upon receipt of the IDENTITY REQUEST message the mobile station sends back an IDENTITY RESPONSE message. The IDENTITY RESPONSE message contains the identification parameters as requested by the network.

Upon receipt of the IDENTITY RESPONSE the network shall stop timer T3270.

4.3.3.3 Abnormal cases

(a) RR connection failure:

Upon detection of a RR connection failure before the IDENTITY RESPONSE is received, the network shall release all MM connections (if any) and abort any ongoing MM specific procedure.

(b) Expiry of timer T3270:

The identification procedure is supervised by the network by the timer T3270. At expiry of the timer T3270 the network may release the RR connection. In this case, the network shall abort the identification procedure and any ongoing MM specific procedure, release all MM connections if any, and initiate the RR connection release procedure as described in 3GPP TS 44.018 [84] subclause 3.5 and 3GPP TS 25.331 [23c].

```
mobile station                          network
                    ID REQ
        <-----------------------         Start T3270
                    ID RES
        ----------------------->         Stop T3270
```
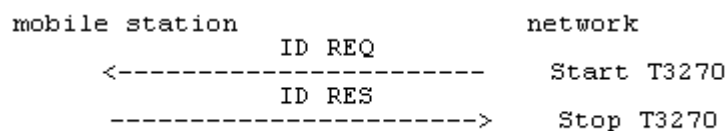
Figure 4.3/3GPP TS 24.008: Identification sequence

(c) Requested identity is not available:

If the MS cannot encode the requested identity in the IDENTITY RESPONSE message, e.g. because no valid SIM is available, then it shall encode the identity type as "No identity".

4.7.8   Identification procedure

The identification procedure is used by the network to request an MS to provide specific identification parameters to the network e.g. International Mobile Subscriber Identity, International Mobile Equipment Identity (see 3GPP TS 23.003 [10]). For the presentation of the IMEI, the requirements of 3GPP TS 42.009 [5] apply.

4.7.8.1   Identification initiation by the network

The network initiates the identification procedure by transferring an IDENTITY REQUEST message to the MS and starts the timer T3370. The IDENTITY REQUEST message specifies the requested identification parameters in the identity type information element.

4.7.8.2   Identification response by the MS

An MS that has been attached to GPRS shall be ready to respond to an IDENTITY REQUEST message at any time.

Upon receipt of the IDENTITY REQUEST message the MS sends back an IDENTITY RESPONSE message. The IDENTITY RESPONSE message shall contain the identification parameters as requested by the network.

4.7.8.3   Identification completion by the network

Upon receipt of the IDENTITY RESPONSE the network shall stop timer T3370.

4.7.8.3a   Abnormal cases in the MS

(a) Requested identity is not available:

If the MS cannot encode the requested identity in the IDENTITY RESPONSE message, e.g. because no valid SIM is available, then it shall encode the identity type as "No identity".

10.5.1.4   Mobile Identity

The purpose of the *Mobile Identity* information element is to provide either the international mobile subscriber identity, IMSI, the temporary mobile subscriber identity, TMSI/P-TMSI, the international mobile equipment identity, IMEI or the international mobile equipment identity together with the software version number, IMEISV.

The IMSI shall not exceed 15 digits, the TMSI/P-TMSI is 4 octets long, and the IMEI is composed of 15 digits, the IMEISV is 16 digits (see 3GPP TS 23.003 [10]).

For packet paging the network shall select the mobile identity type with the following priority:

1- P-TMSI: The P-TMSI shall be used if it is available.

2- IMSI: The IMSI shall be used in cases where no P-TMSI is available.

For all other transactions except emergency call establishment, emergency call re-establishment, mobile terminated call establishment, the identification procedure, the GMM identification procedure, the GMM authentication and ciphering procedure and the ciphering mode setting procedure, the mobile station and the network shall select the mobile identity type with the following priority:

1- TMSI: The TMSI shall be used if it is available.

2- IMSI: The IMSI shall be used in cases where no TMSI is available.

For mobile terminated call establishment the mobile station shall select the same mobile identity type as received from the network in the PAGING REQUEST message.

For emergency call establishment and re-establishment the mobile station shall select the mobile identity type with the following priority:

1- TMSI: The TMSI shall be used if it is available and if the location update status is UPDATED, and the stored LAI is equal to the one received on the BCCH from the current serving cell.

2- IMSI: The IMSI shall be used in cases where no TMSI is available or TMSI is available but either the update status is different from UPDATED, or the stored LAI is different from the one received on the BCCH from the current serving cell.

3- IMEI: The IMEI shall be used in cases where no SIM/USIM is available or the SIM/USIM is considered as not valid by the mobile station or no IMSI or TMSI is available.

In the identification procedure and in the GMM identification procedure the mobile station shall select the mobile identity type which was requested by the network, if available. If the requested identity is not available, then the mobile station shall indicate the identity type "No Identity".

In the ciphering mode setting procedure and in the GMM authentication and ciphering procedure the mobile shall select the IMEISV.

The *Mobile Identity* information element is coded as shown in figure 10.5.4/3GPP TS 24.008 and table 10.5.4/3GPP TS 24.008.

The *Mobile Identity* is a type 4 information element with a minimum length of 3 octet and 11 octets length maximal. Further restriction on the length may be applied, e.g. number plans.
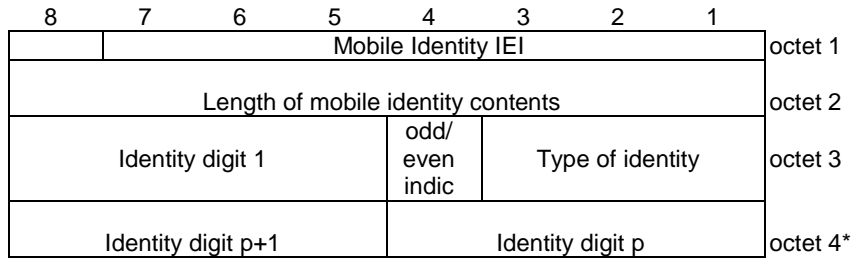
8	7	6	5	4	3	2	1	
	Mobile Identity IEI							octet 1
Length of mobile identity contents								octet 2
Identity digit 1				odd/ even indic	Type of identity			octet 3
Identity digit p+1				Identity digit p				octet 4*

Figure 10.5.4/3GPP TS 24.008 *Mobile Identity* information element

Table 10.5.4/3GPP TS 24.008: *Mobile Identity* information element

Type of identity (octet 3)
Bits
3 2 1
0 0 1 IMSI
0 1 0 IMEI
0 1 1 IMEISV
1 0 0 TMSI/P-TMSI
0 0 0 No Identity note 1)

All other values are reserved.

Odd/even indication (octet 3)
Bit
4
0 even number of identity digits and also when the TMSI/P-TMSI is used
1 odd number of identity digits

Identity digits (octet 3 etc)

For the IMSI, IMEI and IMEISV this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111".

If the mobile identity is the TMSI/P-TMSI then bits 5 to 8 of octet 3 are coded as "1111" and bit 8 of octet4 is the most significant bit and bit 1 of the last octet the least significant bit. The coding of the TMSI/P-TMSI is left open for each administration.

NOTE: This can be used in the case when a fill paging message without any valid identity has to be sent on the paging subchannel and when the requested identity is not available at the mobile station during the identity request procedure.

CR-Form-v7

CHANGE REQUEST

⌘ **24.008** CR **882** ⌘rev **1** ⌘ Current version: **6.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network ☐   Core Network **X**

Title: ⌘	Follow-on proceed for the PS domain	
Source: ⌘	Ericsson	
Work item code: ⌘	TEI6	***Date:*** ⌘ 13/05/2004
Category: ⌘ **B**		***Release:*** ⌘ Rel-6

Use *one* of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use *one* of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change: ⌘	In UMTS, the PS signalling connection between the mobile station and the network (i.e. SGSN) may either be released right after finishing a GMM specific procedure or prolonged for following mobile station originated activity (e.g. SM or SMS requests).
	At present, TS 24.008 describes how the mobile station can request to prolong an established PS signalling connection using GMM protocol signalling (i.e. Follow-on request (FOR) mechanism), but TS 24.008 has no mechanism to inform the mobile station whether the PS signalling connection has actually been prolonged. This lack of information leads to unnecessary signalling and higher service response time when the PS signalling connection is not prolonged, though requested and when the PS signalling connection is prolonged, though not requested.
	The introduction of the FOP mechanism for the PS domain achieves signalling and service response time reduction and decreases power consumption in terminals for the GPRS attach and RAU procedures cases.
Summary of change: ⌘	The Follow-on proceed (FOP) mechanism like in CS domain is introduced. The FOP can be indicated in the ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT messages by the SGSN.
	The mobile station acts according to the FOP bit included in the acceptance message of GMM specific procedure. This avoids any unnecessary signalling. If follow-on proceed is indicated and there is any CM sublayer request pending, the mobile station sends appropriate message(s) (for example, ACTIVATE PDP CONTEXT REQUEST) to the SGSN.

		It is also specified the scenario in which requests received from CM sublayer (e.g. SM or SMS requests) occur after ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has been sent. These requests can be delayed or rejected depending on implementation, until the GMM specific procedure is finished. The FOP mechanism does not change the current SGSN behaviour with regard to the existing FOR indicator and when the SGSN should prolong the PS signalling connection. Additionally, no new information elements have to be added in existing messages; just an already existing spare bit is used to carry the FOP indicator.
Consequences if not approved:	⌘	The GMM protocol continues not providing mechanism to inform the mobile station whether the PS signalling connection has actually been prolonged. The mobile station is mandated to always send pending requests coming from upper layers, if the terminal has set the FOR indicator on and the appropriate GMM procedure is successfully finished. This is not the optimal way, because the network is allowed to choose not to prolong the PS signalling connection though requested; unnecessary signalling is possible. The signalling over the radio link and the service reponse are not reduced. Furthermore, the power consumption is not decreased.

Clauses affected:	⌘	4.7.3.1.1, 4.7.3.1.3, 4.7.3.2.1, 4.7.3.2.3, 4.7.5.1.1, 4.7.5.1.3, 4.7.5.2.1, 4.7.5.2.3, 4.7.13, 10.5.5.1, 10.5.5.17

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<div style="border:1px solid">

FIRST CHANGE

</div>

4.7.3.1.1   GPRS attach procedure initiation

In state GMM-DEREGISTERED, the MS initiates the GPRS attach procedure by sending an ATTACH REQUEST message to the network, starts timer T3310 and enters state GMM-REGISTERED-INITIATED.

The MS capable both UMTS and GSM or only GSM system shall include a valid P-TMSI, if any is available, the P-TMSI signature associated with the P-TMSI and the routing area identity associated with the P-TMSI in the ATTACH REQUEST message. If there is no valid P-TMSI available, the IMSI shall be included instead of the P-TMSI and P-TMSI signature.

The MS shall also indicate within the DRX parameters whether it supports the split pg cycle option on CCCH. The optional support of the split pg cycle on CCCH by the network is indicated in SI13 or PSI1. Split pg cycle on CCCH is applied by both the network and the MS when the split pg cycle option is supported by both (see 3GPP TS 45.002 [32]).

In UMTS, if the MS wishes to prolong the established PS signalling connection after the GPRS attach procedure (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

<div style="border:1px solid">

NEXT CHANGE

</div>

4.7.3.1.3   GPRS attach accepted by the network

If the GPRS attach request is accepted by the network, an ATTACH ACCEPT message is sent to the MS.

The P-TMSI reallocation may be part of the GPRS attach procedure. When the ATTACH REQUEST includes the IMSI, the SGSN shall allocate the P-TMSI. The P-TMSI that shall be allocated is then included in the ATTACH ACCEPT message together with the routing area identifier. The network shall, in this case, change to state GMM-COMMON-PROCEDURE-INITIATED and shall start timer T3350 as described in subclause 4.7.6. Furthermore, the network may assign a P-TMSI signature for the GMM context which is then also included in the ATTACH ACCEPT message. If the LAI or PLMN identity that has been transmitted in the ATTACH ACCEPT message is a member of any of the "forbidden" lists, any such entry shall be deleted. Additionally, the network shall include the radio priority level to be used by the MS for mobile originated SMS transfer in the ATTACH ACCEPT message.

In GSM, the Cell Notification information element shall be included in the ATTACH ACCEPT message by the network which indicates that the Cell Notification is supported by the network.

In UMTS, the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ATTACH REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

The MS, receiving an ATTACH ACCEPT message, stores the received routing area identification, stops timer T3310, reset the GPRS attach attempt counter, reset the routing area updating attempt counter, enters state GMM-REGISTERED and sets the GPRS update status to GU1 UPDATED.

If the message contains a P-TMSI, the MS shall use this P-TMSI as the new temporary identity for GPRS services. In this case, an ATTACH COMPLETE message is returned to the network. The MS shall delete its old P-TMSI and shall store the new one. If no P-TMSI has been included by the network in the ATTACH ACCEPT message, the old P-TMSI, if any available, shall be kept.

If the message contains a P-TMSI signature, the MS shall use this P-TMSI signature as the new temporary signature for the GMM context. The MS shall delete its old P-TMSI signature, if any is available, and shall store the new one. If the message contains no P-TMSI signature, the old P-TMSI signature, if available, shall be deleted.

The network may also send a list of "equivalent PLMNs" in the ATTACH ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the network that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ATTACH ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message.

After that in UMTS, ~~if~~ the mobile station shall act according to the ~~has indicated~~ follow-on proceed~~request flag~~~~pending~~ included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).~~and has a CM application request pending, it shall send an appropriate message (for example ACTIVATE PDP CONTEXT REQUEST) to the network.~~

In GSM, if the ATTACH ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates. The network receiving an ATTACH COMPLETE message stops timer T3350, changes to GMM-REGISTERED state and considers the P-TMSI sent in the ATTACH ACCEPT message as valid.

The network may also send a list of local emergency numbers in the ATTACH ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ATTACH ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

NEXT CHANGE

4.7.3.2.1 Combined GPRS attach procedure initiation

If the MS is in GMM state GMM-DEREGISTERED and in MM state MM IDLE, the MS initiates the combined GPRS attach procedure by sending an ATTACH REQUEST message to the network, starts timer T3310 and enters state GMM-REGISTERED-INITIATED and MM LOCATION UPDATING PENDING.

The MS shall include a valid P-TMSI, if available, the P-TMSI signature associated with the P-TMSI and the routing area identity associated with the P-TMSI in the ATTACH REQUEST message. If there is no valid P-TMSI available, the IMSI shall be included instead of the P-TMSI and P-TMSI signature. Furthermore the MS shall include the TMSI status IE if no valid TMSI is available.

In UMTS, if the MS wishes to prolong the established PS signalling connection after the GPRS attach (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

4.7.3.2.2 GMM Common procedure initiation

The network may initiate GMM common procedures, e.g. the GMM identification and GMM authentication and ciphering procedure, depending on the received information such as IMSI, CKSN, old RAI, P-TMSI and P-TMSI signature.

4.7.3.2.3   Combined GPRS attach accepted by the network

Depending on the value of the attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

Case 1)   The attach result IE value indicates "combined GPRS attach": IMSI attach for GPRS and non-GPRS services have been successful.

Case 2)   The attach result IE value indicates "GPRS only": IMSI attach for GPRS services has been successful but IMSI attach for non-GPRS services has not been successful.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message.

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).

NEXT CHANGE

4.7.5.1.1   Normal and periodic routing area updating procedure initiation

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED. The message ROUTING AREA UPDATE REQUEST shall contain the P-TMSI signature when received within a previous ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message.

In UMTS, if the MS wishes to prolong the established PS signalling connection after the normal routing area updating procedure (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

NEXT CHANGE

4.7.5.1.3   Normal and periodic routing area updating procedure accepted by the network

If the routing area updating request has been accepted by the network, a ROUTING AREA UPDATE ACCEPT message shall be sent to the MS. The network may assign a new P-TMSI and/or a new P-TMSI signature for the MS. If a new P-TMSI and/or P-TMSI signature have been assigned to the MS, it/they shall be included in the ROUTING AREA UPDATE ACCEPT message together with the routing area identification.

If a new DRX parameter was included in the ROUTING AREA UPDATE REQUEST message, the network shall store the new DRX parameter and use it for the downlink transfer of signalling and user data.

In GSM the Cell Notification information element shall be included in the ROUTING AREA UPDATE ACCEPT message in order to indicate the ability of the network to support the Cell Notification.

The network shall change to state GMM-COMMON-PROCEDURE-INITIATED and shall start the supervision timer T3350 as described in subclause 4.7.6.

If the LAI or PLMN identity contained in the ROUTING AREA UPDATE ACCEPT message is a member of any of the "forbidden" lists then any such entry shall be deleted.

In UMTS, the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ROUTING AREA UPDATE REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

If the PDP context status information element is included in ROUTING AREA UPDATE REQUEST message, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

Upon receipt of a ROUTING AREA UPDATE ACCEPT message, the MS stores the received routing area identification, stops timer T3330, shall reset the routing area updating attempt counter and sets the GPRS update status

to GU1 UPDATED. If the message contains a P-TMSI, the MS shall use this P-TMSI as new temporary identity for GPRS services and shall store the new P-TMSI. If no P-TMSI was included by the network in the ROUTING AREA UPDATING ACCEPT message, the old P-TMSI shall be kept. Furthermore, the MS shall store the P-TMSI signature if received in the ROUTING AREA UPDATING ACCEPT message. If no P-TMSI signature was included in the message, the old P-TMSI signature, if available, shall be deleted.

If the ROUTING AREA UPDATE REQUEST message was used to update the network with a new DRX parameter IE, the MS shall start using the new DRX parameter upon receipt of the ROUTING AREA UPDATE ACCEPT message.

If the PDP context status information element is included in ROUTING AREA UPDATE ACCEPT message, then the MS shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and network), which are not in SM state PDP-INACTIVE in the MS but are indicated by the network as being in state PDP-INACTIVE.

In GSM, if the ROUTING AREA UPDATE ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates.

The network may also send a list of "equivalent PLMNs" in the ROUTING AREA UPDATE ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the network that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ROUTING AREA UPDATE ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contained:

-   a P-TMSI; and/or

-   Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case the Receive N-PDU Numbers values valid in the MS, shall be included in the ROUTING AREA UPDATE COMPLETE message.

NOTE 1:   In UMTS, after a routing area updating procedure, the mobile station can initiate Service Request procedure to request the resource reservation for the active PDP contexts if the resources have been released by the network or send upper layer message (e.g. ACTIVATE PDP CONTEXT REQUEST) to the network via the existing PS signaling connection.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.

After that in UMTS, if the mobile station shall act according to the has indicated follow-on proceedrequest flagpending included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).and has a CM application request pending, it shall send an appropriate message (for example ACTIVATE PDP CONTEXT REQUEST) to the network.

The network may also send a list of local emergency numbers in the ROUTING AREA UPDATE ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ROUTING AREA UPDATE ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE 2: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

<div align="center">

NEXT CHANGE

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4.7.5.2.1 Combined routing area updating procedure initiation

The combined routing area updating procedure is initiated only by a GPRS MS operating in MS operation modes A or B, if the MS is in state GMM-REGISTERED and MM-IDLE, and if the network operates in network operation mode I:

- when a GPRS MS that is IMSI attached for GPRS and non-GPRS services detects a change of the routing area in state GMM-REGISTERED and MM-IDLE;

- when a GPRS MS that is IMSI attached for GPRS services wants to perform an IMSI attach for non-GPRS services;

- after termination of a non-GPRS service via non-GPRS channels to update the association if the MS has changed the RA during that non-GPRS service transaction;

- after termination of non-GPRS service via non-GPRS channels to update the association if GPRS services were suspended during the non-GPRS service but no resume is received. See 3GPP TS 23.060 subclause 16.2.1;

  - after a CM SERVICE REJECT message with cause value #4 is received by the mobile station (see subclause 4.5.1.1); in this case the update type IE shall be set to "Combined RA/LA updating with IMSI attach";

  - when a GPRS MS needs to update the network with the new MS Radio Access Capability IE;

  - when a GPRS MS needs to update the network with a new DRX parameter IE; or

  - in UMTS, to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

In GSM, the routing and location area identification are broadcast on the broadcast channel(s). A combined routing area updating procedure shall abort any ongoing GMM procedure. Aborted GMM procedures shall be repeated after the combined routing area updating procedure has been successfully performed. The ROUTING AREA UPDATE REQUEST message shall always be the first message sent from the MS in the new routing area after routing area change.

In UMTS, the routing and location area identification are broadcast on the broadcast channel(s) or sent to the MS via the PS signaling connection. A combined routing area updating procedure shall abort any ongoing GMM procedure. Aborted GMM procedures may be repeated after the combined routing area updating procedure has been successfully performed. The ROUTING AREA UPDATE REQUEST message shall always be the first GMM message sent from the MS in the new routing area after routing area change.

To initiate a combined routing area updating procedure the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-UPDATING-INITIATED and MM LOCATION UPDATING PENDING. The value of the update type IE in the message shall indicate "combined RA/LA updating". If for the last attempt to update the registration of the location area a MM specific procedure was performed, the value of the update type IE in the ROUTING AREA UPDATE REQUEST message shall indicate "combined RA/LA updating with IMSI attach". Furthermore the MS shall include the TMSI status IE if no valid TMSI is available.

A GPRS MS in MS operation modes A or B that is in an ongoing circuit-switched transaction, shall initiate the combined routing area updating procedure after the circuit-switched transaction has been released, if the MS has changed the RA during the circuit-switched transaction and if the network operates in network operation mode I.

A GPRS MS in MS operation mode A shall initiate the combined routing area updating procedure with IMSI attach after the circuit-switched transaction has been released if a GPRS attach was performed during the circuit-switched transaction and provided that the network operates in network operation mode I.

A GPRS MS in MS operation mode A shall perform the normal routing area update procedure during an ongoing circuit-switched transaction.

In UMTS, if the MS wishes to prolong the established PS signalling connection after the normal routing area updating procedure ~~when it is served under UMTS area~~(for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

In UMTS, when a ROUTING AREA UPDATE REQUEST is received by the SGSN over a new PS signalling connection while there is an ongoing PS signalling connection (network is already in mode PMM-CONNECTED) for this UE, the network shall progress the routing area update procedure as normal and release the previous PS signalling connection when the routing area update procedure has been accepted by the network.

NOTE: The re-establishment of the radio bearers of active PDP contexts is done as described in subclause "Service Request procedure".

4.7.5.2.2 GMM Common procedure initiation

The network may initiate GMM common procedures, e.g. the GMM authentication and ciphering procedure.

4.7.5.2.3 Combined routing area updating procedure accepted by the network

Depending on the value of the update result IE received in the ROUTING AREA UPDATE ACCEPT message, two different cases can be distinguished:

Case 1) The update result IE value indicates "combined RA/LA": Routing and location area updating is successful;

Case 2) The update result IE value indicates "RA only": Routing area updating is successful, but location area updating is not successful.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contains:

- a P-TMSI and/or a TMSI; and/or

- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case, the Receive N-PDU Numbers that are valid in the MS shall be included in the ROUTING AREA UPDATE COMPLETE message.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message. ~~the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ROUTING AREA UPDATE REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.~~

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).

NEXT CHANGE

4.7.13 Service Request procedure (UMTS only)

The purpose of this procedure is to transfer the PMM mode from PMM-IDLE to PMM-CONNECTED mode, and/or to assign radio access bearer in case of PDP contexts are activated without radio access bearer assigned. In latter case, the PMM mode may be PMM-IDLE mode or may alternatively be the PMM-CONNECTED mode if the MS requires radio access bearer re-establishment. This procedure is used for;

- the initiation of CM layer service (e.g. SM or SMS) procedure from the MS in PMM-IDLE mode,

- the network to transfer down link signalling,

- uplink (in PMM-IDLE or PMM CONNECTED) and downlink (only in PMM-IDLE) user data.

For downlink transfer of signalling or user data in PMM-IDLE mode, the trigger is given from the network by the paging request procedure, which is out of scope of the present document.

For pending downlink user data in PMM-CONNECTED mode, the re-establishment of radio access bearers for all active PDP contexts is done without paging.

Service type can take either of the following values, "signalling", "data" or "paging response". Each of the values shall be selected according to the criteria to initiate the Service request procedure.

The criteria to invoke the Service request procedure are when;

   a) the MS has any signalling messages except GMM messages (e.g. for SM or SMS) to be sent to the network in PMM-IDLE mode (i.e., no secure PS signalling connection has been established). In this case, the service type shall be set to "signalling".

   b) the MS, either in PMM-IDLE or PMM-CONNECTED mode, has pending user data to be sent and no radio access bearer is established for the corresponding PDP context. The procedure is initiated by an indication from the lower layers (see 3GPP TS 24.007 [20]). In this case, the service type shall be set to "data". If in PMM-CONNECTED mode, a Service Request with service type "data" was already accepted by the network the MS shall not issue a second Service Request with service type "data" unless the PMM-IDLE state is entered again.

   c) the MS receives a paging request for PS domain from the network in PMM-IDLE mode. In this case, the service type shall be set to "paging response".

If one of the above criteria to invoke the Service request procedure is fulfilled, the GMM sublayer first decides whether to accept, delay, or reject this request. The Service request procedure may only be initiated by the MS when the following conditions are fulfilled:

   - its GPRS update status is GU1 UPDATED; and

   - no GMM specific procedure is ongoing.

If a GMM specific procedure is ongoing and the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has been sent, the Service request procedure shall be delayed until the GMM specific procedure is completed. If the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has not been sent, the MS may indicate "follow-on request pending"in the message (i.e. the MS wishes to prolong the established PS signalling connection after the GMM specific procedure). Then, the MS shall delay the Service request procedure until the GMM specific procedure is completed. If the network indicates in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message "no follow-on proceed", the MS shall perform the delayed Service request procedure when the current signalling connection is subsequently released. If "follow-on proceed" is indicated and the service type is

   - "signalling": the MS shall send the pending signalling messages immediately;

   - "data": the MS shall immediately perform the delayed Service request procedure using the current PS signalling connection;

   - "paging response": no specific action is required from the MS after completion of the GMM specific procedure.

After completion of a Service request procedure but before re-establishment of radio access bearer, if the PDP context status information element is included, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

After completion of a Service request procedure, the pending service is resumed and uses then the connection established by the procedure. If the service type is indicating "data", then the radio access bearers for all activated PDP contexts are re-established by the network, except for those activated PDP contexts having maximum bit rate value set to 0 kbit/s for both uplink and downlink. The re-establishment of radio access bearers for those PDP contexts is specified in subclause 6.1.3.3.

The selective re-assignment capability is not supported for the simplicity of the function.

NEXT CHANGE

10.5.5.1 Attach result

The purpose of the *attach result* information element is to specify the result of a GPRS attach procedure.

The *attach result* is a type 1 information element.

The *attach result* information element is coded as shown in figure 10.5.117a/3GPP TS 24.008 and table 10.5.134a/3GPP TS 24.008.
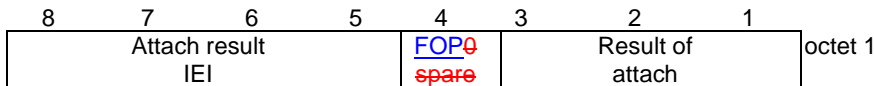
8	7	6	5	4	3	2	1	
Attach result IEI				FOP0 spare	Result of attach			octet 1

Figure 10.5.117a/3GPP TS 24.008: *Attach result* information element

Table 10.5.134a/3GPP TS 24.008: *Attach result* information element

Result of attach (octet 1)
Bits
3 2 1
0 0 1 GPRS only attached
0 1 1 Combined GPRS/IMSI attached

All other values are reserved.

Follow-on proceed (octet 1, bit 4)
Bits
4
0 Follow-on proceed
1 No follow-on proceed
Follow-on proceed is applicable only in UMTS.

NEXT CHANGE

10.5.5.17 Update result

The purpose of the *update result* information element is to specify the result of the associated updating procedure.

The *update result* is a type 1 information element.

The *update result* information element is coded as shown in figure 10.5.131/3GPP TS 24.008 and table 10.5.149/3GPP TS 24.008.
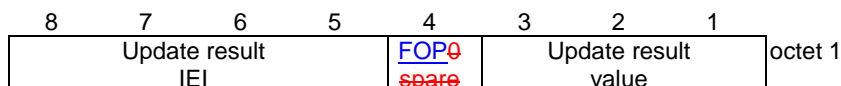
8	7	6	5	4	3	2	1	
Update result IEI				FOP0 spare	Update result value			octet 1

Figure 10.5.131/3GPP TS 24.008: *Update result* information element

Table 10.5.149/3GPP TS 24.008: *Update result* **information element**

Update result value   (octet 1)
Bits
3   2   1
0   0   0   RA updated
0   0   1   combined RA/LA updated
All other values are reserved.
Follow-on proceed (octet 1, bit 4)
Bits
4
0   Follow-on proceed
1   No follow-on proceed
Follow-on proceed is applicable only in UMTS.