Source: TSG_N WG "1"

Title: CRs to 3G Work Item "GPRS"

Agenda item: 6.13

Document for: APPROVAL

Introduction:

This document contains **"11"** CRs on **Work Item "GPRS",** that have been agreed by **TSG_N WG "1",** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N1-000658	24.008	CR209		F	R99	3.3.1	3.4.0	Network behaviour, abnormal cases detach
N1-000659	24.008	CR210		F	R99	3.3.1	3.4.0	IEI value of the 'Tear down indicator' IE
N1-000667	24.008	CR214		C	R99	3.3.1	3.4.0	Modification of MS Classmark 3 and modification of MS RA Capabilities, for DTM mobile stations.
N1-000668	24.007	CR015		C	R99	3.3.1	3.4.0	Protocol Discriminator to route packet data sent by a DTM mobile from BSC to PCU
N1-000721	24.008	CR193	1	F	R99	3.3.1	3.4.0	MODIFY PDP CONTEXT REJECT – message definition
N1-000760	04.08	CRA1029	1	F	R97	6.10.0	6.11.0	Clarification on local and foreign TLLI management
N1-000761	04.08	CRA1027	1	A	R98	7.7.0	7.8.0	Clarification on local and foreign TLLI management
N1-000762	24.008	CR222	1	A	R99	3.3.1	3.4.0	Clarification on local and foreign TLLI management
N1-000763	24.007	CR014	2	F	R99	3.3.1	3.4.0	Change of the GMM Ready Timer behaviour
N1-000791	24.008	CR208	3	F	R99	3.3.1	3.4.0	Change of the GMM Ready Timer behaviour
N1-000792	04.64	CRA142	2	F	R99	8.3.0	8.4.0	Change of the GMM Ready Timer behaviour

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.008 CR	209	Current Version:	**3.3.1**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to: CN#8   for approval **X**   strategic ☐ *(for SMG use only)*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐   ME ☐   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source:	Siemens AG		**Date:**	15.05.00

Subject:	Network behaviour, abnormal cases detach

Work item:	GPRS

Category: F Correction   **X**   **Release:**   Phase 2 ☐
                A Corresponds to a correction in an earlier release ☐   Release 96 ☐
(only one category   B Addition of feature ☐   Release 97 ☐
shall be marked   C Functional modification of feature ☐   Release 98 ☐
with an X)   D Editorial modification ☐   Release 99 **X**
                                                      Release 00 ☐

Reason for change:	In the description of the " Abnormal cases on the network side " for the Detach procedure, in the bullet point d) which defines the network behaviour in the case of a procedure collision with a Attach procedure the case of the detach type "re-attach not required" is described twice by error. Instead of the detach type "re-attach not required" the last sentence defines the network behaviour for the detach type "IMSI detach".

Clauses affected:	4.7.4.2.4

Other specs affected:

Other 3G core specifications	☐	→ List of CRs:	
Other GSM core specifications	☐	→ List of CRs:	
MS test specifications	☐	→ List of CRs:	
BSS test specifications	☐	→ List of CRs:	
O&M specifications	☐	→ List of CRs:	

Other comments:	

4.7.3.1.5 Abnormal cases in the MS

The following abnormal cases can be identified:

a) Access barred because of access class control

The GPRS attach procedure shall not be started. The MS stays in the current serving cell and applies normal cell reselection process. The GPRS attach procedure is started as soon as possible, i.e. when access is granted or because of a cell change.

b) Lower layer failure before the ATTACH ACCEPT or ATTACH REJECT message is received

The procedure shall be aborted. The MS shall proceed as described below.

c) T3310 time-out

On the first expiry of the timer, the MS reset and restart timer T3310 and shall retransmit the ATTACH REQUEST message. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3310, the GPRS attach procedure shall be aborted and the MS shall proceed as described below.

d) ATTACH REJECT, other causes than those treated in section 4.7.3.1.4
The MS shall proceed as described below.

e) Change of cell within the same RA (GSM only)

If a cell change occurs within the same RA when the MS is in state GMM-REGISTERED-INITIATED, then the cell update procedure shall be performed before completion of the attach procedure.

f) Change of cell into a new routing area

If a cell change into a new routing area occurs before an ATTACH ACCEPT or ATTACH REJECT message has been received, the GPRS attach procedure shall be aborted and re-initiated immediately. If a routing area border is crossed when the ATTACH ACCEPT message is received but before an ATTACH COMPLETE message is sent, the GPRS attach procedure shall be aborted and the routing area updating procedure shall be initiated. If a P-TMSI was allocated during the GPRS attach procedure, this P-TMSI shall be used in the routing area updating procedure. If a P-TMSI signature was allocated together with the P-TMSI during the GPRS attach procedure, this P-TMSI signature shall be used in the routing area updating procedure.

g) Mobile originated detach required

If the MS is in state GMM-REGISTERED-INITIATED, the GPRS attach procedure shall be aborted and the GPRS detach procedure shall be performed (see 4.7.4.1).

h) Procedure collision

If the MS receives a DETACH REQUEST message from the network in state GMM-REGISTERED-INITIATED with type of detach 're-attach not required, the GPRS detach procedure shall be progressed and the GPRS attach procedure shall be aborted. Otherwise the GPRS attach procedure shall be progressed and the DETACH REQUEST message shall be ignored.

In cases b, c and d the MS shall proceed as follows. Timer T3310 shall be stopped if still running. The GPRS attach attempt counter shall be incremented.
If the GPRS attach attempt counter is less than 5:
-   timer T3311 is started and the state is changed to GMM-DEREGISTERED.ATTEMPTING-TO-ATTACH.
If the GPRS attach attempt counter is greater than or equal to 5:
-   the MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number, shall set the GPRS update status to GU2 NOT UPDATED, shall start timer T3302. The state is changed to GMM-DEREGISTERED..ATTEMPTING-TO-ATTACH or optionally to GMM-DEREGISTERED.PLMN-SEARCH (see 4.2.4.1.2).
-   In UMTS, in case c the MS shall release the PS signaling connection and in case d the network shall release the PS signaling connection for this MS (see TS 25.331).

4.7.4.2.4 Abnormal cases on the network side

The following abnormal cases can be identified:

a) T3322 time-out

On the first expiry of the timer, the network shall retransmit the DETACH REQUEST message and shall start timer T3322. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3322, the GPRS detach procedure shall be aborted and the network changes to state GMM-DEREGISTERED.

b) Low layer failure

The GPRS detach procedure is aborted and the network changes to state GMM-DEREGISTERED.

c) GPRS detach procedure collision

If the network receives a DETACH REQUEST message with "switching off" indicated, before the network initiated GPRS detach procedure has been completed, both procedures shall be considered completed.

If the network receives a DETACH REQUEST message without "switching off" indicated, before the network initiated GPRS detach procedure has been completed, the network shall send a DETACH ACCEPT message to the MS.

d) GPRS detach and GPRS attach procedure collision

If the network receives an ATTACH REQUEST message before the network initiated GPRS detach procedure with type of detach 're-attach not required' has been completed, the network shall ignore the ATTACH REQUEST message. If the detach type IE value, sent in the DETACH REQUEST message, indicates "re-attach required" the detach procedure is aborted and the GPRS attach procedure shall be progressed after the PDP contexts have been deleted. If the detach type IE value, sent in the DETACH REQUEST message, indicates "IMSI detach~~re-attach not required~~" the detach procedure is aborted and the GPRS attach procedure shall be progressed.

e) GPRS detach and routing area updating procedure collision

GPRS detach containing detach type "re-attach required" or "re-attach not required":

If the network receives a ROUTING AREA UPDATE REQUEST message before the network initiated GPRS detach procedure has been completed, the detach procedure shall be progressed, i.e. the ROUTING AREA UPDATE REQUEST message shall be ignored.

GPRS detach containing detach type "IMSI detach":

If the network receives a ROUTING AREA UPDATE REQUEST message before the network initiated GPRS detach procedure has been completed, the network shall abort the detach procedure, shall stop T3322 and shall progress the routing area update procedure.

f) GPRS detach and service request procedure collision

If the network receives a SERVICE REQUEST message before the network initiated GPRS detach procedure has been completed, the network shall ignore the SERVICE REQUEST message.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.008 CR **210**	Current Version: 3.3.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑　　　　　↑ *CR number as allocated by MCC support team*

For submission to: CN #8　　　for approval **X**　　　strategic ☐ *(for SMG*
list expected approval meeting # here ↑　　for information ☐　　non-strategic ☐ *use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG　　*The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM ☐　ME **X**　UTRAN / Radio ☐　Core Network **X**
(at least one should be marked with an X)

Source:	Siemens AG		**Date:**	15.05.99

Subject:	IEI value of the 'Tear down indicator' IE

Work item:	GPRS

Category:　F　Correction　　　　　　　　　　　　　　　**X**　**Release:**　Phase 2　☐
　　　　　　　　A　Corresponds to a correction in an earlier release　☐　　　　　　Release 96　☐
(only one category　B　Addition of feature　☐　　　　　　　　　　　　　Release 97　☐
shall be marked　C　Functional modification of feature　☐　　　　　　Release 98　☐
with an X)　　　D　Editorial modification　☐　　　　　　　　　　　Release 99　**X**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Release 00　☐

Reason for change:	As the 'Tear down indicator' IE is a type 1 information element, the value of the IEI in the Deactivate PDP context request my only be in the range 0-16 and is proposed to be corrected to the value 9.

Clauses affected:	9.5.14

Other specs affected:
Other 3G core specifications　☐　→ List of CRs:
Other GSM core specifications　☐　→ List of CRs:
MS test specifications　☐　→ List of CRs:
BSS test specifications　☐　→ List of CRs:
O&M specifications　☐　→ List of CRs:

Other comments:	

9.5.14   Deactivate PDP context request

This message is sent to request deactivation of an active PDP context. See table 9.5.8/TS 24.008.

Message type: DEACTIVATE PDP CONTEXT REQUEST

Significance: global

Direction: both

Table 9.5.14/TS 24.008: DEACTIVATE PDP CONTEXT REQUEST message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2– 3/2
	Deactivate PDP context request message identity	Message type 10.4	M	V	1
	SM cause	SM cause 10.5.6.6	M	V	1
359-	Tear down indicator	Tear down indicator 10.5.6.10	O	TV	1

9.5.14.1   Tear down indicator

This IE is included in the message in order to indicate whether only the PDP context associated with this specific TI or all active PDP contexts sharing the same PDP address as the PDP context associated with this specific TI shall be deactivated..

10.5.6.10 Tear down indicator

The purpose of the *tear down indicator* information element is to indicate whether only the PDP context associated with this specific TI or all active PDP contexts sharing the same PDP address as the PDP context associated with this specific TI shall be deactivated.

The *tear down indicator* is a type 1 information element.

The *tear down indicator* information element is coded as shown in figure 10.5.142/TS 24.008 and table 10.5.160/TS 24.008.
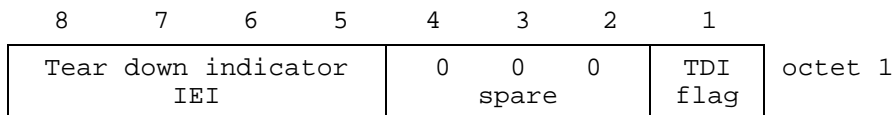
```
   8      7      6      5      4      3      2      1
 ┌───────────────────────────┬────────────────┬────────┐
 │  Tear down indicator      │  0    0    0   │  TDI   │ octet 1
 │        IEI                │     spare      │  flag  │
 └───────────────────────────┴────────────────┴────────┘
```

Figure 10.5.142/TS 24.008: *Tear down indicator* **information element**

Table 10.5.160/GSM 04.08: *Tear down indicator* **information element**

```
Tear down indicator(TDI) flag (octet 1)

Bit
1
0   tear down not requested
1   tear down requested
```

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.008	CR	**214**	Current Version:	3.3.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	CN #8	for approval	**X**	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source:	Vodafone AirTouch	**Date:**	15th May 2000

Subject:	Changes to MS Classmark 3 and MS RA Capabilities for DTM

Work item:	GPRS

Category:	F	Correction		**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature	**X**		Release 98	
with an X)	D	Editorial modification			Release 99	**X**
					Release 00	

Reason for change:	A DTM (Dual Transfer Mode) mobile must be able to signal to both the MSC and SGSN exactly what its DTM capabilities are. This CR proposes that this information is sent to the MSC in the MS Classmark 3 IE, and to the SGSN in the MS RA capabilities IE.

Clauses affected:	10.5.1.7, 10.5.5.12a

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

help.doc

<--------- double-click here for help and instructions on how to create a CR.

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/TS 24.008 and table 10.5.7/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 850 Associated Radio Capability* or PCS *1900 Associated Radio Capability* fields in the MS Classmark 3. Due to shared radio frequency channel numbers between DCS 1800 and PCS 1900, the mobile should indicate support for either DCS 1800 band OR PCS 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 GSM 05.02).

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 <Multi Slot Capability>}
                    <UCS2 treatment: bit>
                            <Extended Measurement Capability : bit>
      { 0 | 1 <MS measurement capability> }
      { 0 | 1 <MS Positioning Method Capability> }
    { 0 | 1 <EDGE Multi Slot Capability>}
    {0  | 1 <EDGE 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 <PCS 1900 Associated Radio Capability : bit(4)>}

      {0 | 1   <DTM Multi Slot Sub-Class : bit(2)>
              <MAC Mode Support : bit>
              <EGPRS Support : bit>} ;

      <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)>;

<Multi Slot Capability> ::=
                            <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)>;

<EDGE Multi Slot Capability> ::=
                            <EDGE Multi Slot Class : bit(5)>;
 <EDGE Struct> : :=
                            <Modulation Capability : bit>
                      { 0 | 1 <EDGE RF Power Capability 1: bit(2)>}
                      { 0 | 1 <EDGE RF Power Capability 2: bit(2)>}
```

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

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

```
Multiband Supported (3 bit field)

Band 1 supported (third bit of the field)
   0       P-GSM not supported
   1       P-GSM supported

Band 2 supported (second bit of the field)
   0       E-GSM or R-GSM not supported
   1       E-GSM or R-GSM supported

Band 3 supported (first bit of the field)
   0       DCS 1800 not supported
   1       DCS 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. If only one band is indicated, the
receiver shall ignore the Associated Radio Capability 2.

For single band mobile station 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

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 DCS1800 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 DCS1800, 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 GSMß05.05).

R Support

In case where the R-GSM band is supported the R-GSM band assciated radio
capability field contains the binary coding of the power class associated(see
GSMß05.05). 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 DCS 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.
```

(continued...)

Table 10.5.1.7/TS 24.008 (continued): *MS Classmark 3* **information element**

Multi Slot Class (5 bit field)

In case the MS supports the use of multiple timeslots then the Multi Slot Class field is coded as the binary representation of the multislot class defined in TS GSM 05.02.

UCS2 treatment

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 GSM 03.38)
         over UCS2.

1   the ME has no preference between the use of the default alphabet and the
         use of UCS2.

Extended Measurement Capability

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 Capability
This bit indicates whether the MS supports Positioning Method or not for the provision of Location Services.

MS Positioning Method (5 bit field)
This field indicates the Positioning Method(s) supported by the mobile station.
MS assisted E-OTD
Bit 5
0:        MS assisted E-OTD not supported
1:        MS assisted E-OTD supported

MS based E-OTD

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

EDGE Multi Slot class (5 bit field)

In case the EDGE 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 EDGE Multi Slot class field is included and is coded as the binary representation of the multislot class defined in TS GSM 05.02.

Modulation Capability

Modulation Capability field indicates the supported modulation scheme by MS 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 is supported for both uplink and downlink, the **EDGE RF Power Capability 1** field indicates the radio capability for GSM900.

The radio capability contains the binary coding of the EDGE power class(see GSMß05.05).

EDGE RF Power Capability 2 (2 bit field)

If 8-PSK is supported for both uplink and downlink, the **EDGE RF Power Capability 2** field indicates the radio capability for DCS1800 or PCS1900 if supported, and is not included otherwise.

The radio capability contains the binary coding of the EDGE power class (see GSM 05.05).

DTM Multi Slot Sub-Class (2 bit field)
This field indicates the DTM capabilities of the MS. The DTM Multi Slot Sub-Class is independent from the Multi Slot Capabilities field.

Bits
2 1
0 0   Sub-Class 1 supported
0 1   Sub-Class 5 supported
1 0   Sub-Class 9 supported
1 1   Reserved for future extension. If received, the network shall interpret this as '00'

MAC Mode Support (1 bit field)
This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive Allocation

Bits
1
0   Dynamic and Fixed Allocation not supported
1   Dynamic and Fixed allocation supported

EGPRS Support (1 bit field)
This field indicates whether or not the MS supports EGPRS

Bit
1
0   EGPRS not supported
1   EGPRS supported

```
GSM 400 Bands Supported (2 bit 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 GSM 05.05).

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)

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 GSM 05.05).

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.

PCS 1900 Associated Radio Capability (4 bit field)

This field indicates whether PCS 1900 band is supported and its associated
radio capability.

The radio capability contains the binary coding of the power class associated
with the PCS 1900 band (see GSM 05.05).

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

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/TS 24.008.

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

- The MS shall indicate supported Access Technology Types. e.g. [450, 480, 900, 1800, UMTS] or [850, 1900] MHz bands during a single MM procedure.

- Error handling : 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.

- See more details about error handling of MS radio access capability in TS GSM 08.18.

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

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

```
< MS Radio Access capability IE > ::=
<MS Radio Access capability IEI :  00100100 >
<Length of MS RA capability: <octet>>        -- length in octets of MS RA capability value part and spare bits
<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) >
< Access capabilities : <Access capabilities struct> >
{ 0 | 1 <MS RA capability  value part struct> } ;



< 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
preceeding Access capabilities field within this IE
   -- The presence of the A5 bits is mandatory in the 1st Access capabilities struct 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
     { 0 | 1 < 8PSK Power Capability : bit(2) >} – '1' also means 8PSK modulation capability in uplink.
        -- error: struct too short, assume features do not exist
        -- error: struct too long, ignore data and jump to next Access technolgy
```

Table 10.5.146/TS 24.008 (continued): *Mobile Station Radio Access Capability* **Information Element**

```
< 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)  > } ;
     { 0 | 1 < ECSD multislot class : bit (5) > }
        { 0 | 1 < EGPRS multislot class : bit (5) > < EGPRS Extended Dynamic Allocation        Capability : bit
> } ;

        {0 | 1  <DTM Multi Slot Sub-Class : bit(2)>
                <MAC Mode Support : bit>
                <EGPRS Support : bit>} ;


<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

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
```
All other values are treated as unknown by the receiver.

RF Power Capability
This field is coded as radio capability in Classmark 3 for the indicated band: it contains the binary coding of he power class associated (see GSM 05.05 paragraph 4.1 output power and paragraph 4.1.1 Mobile Station).

8PSK Power Capability
This field is coded according to the definition in GSM 05.05. The presence of this field indicates also 8PSK modulation capability in uplink.

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.

Table 10.5.146/TS 24.008 (concluded): *Mobile Station Radio Access Capability* **Information Element**

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 TS GSM 05.02.
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 TS GSM 05.02.

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 TS GSM 05.02.
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 TS GSM 05.02.

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.

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)

DTM Multi Slot Sub-Class (2 bit field)
This field indicates the DTM capabilities of the MS. The DTM Multi Slot Sub-Class is independent from the Multi Slot Capabilities field.

Bits
2 1
0 0   Sub-Class 1 supported
0 1   Sub-Class 5 supported

1 0   Sub-Class 9 supported
1 1   Reserved for future extension. If received, the network shall interpret this as '00'

MAC Mode Support (1 bit field)
This field indicates whether the MS supports Dynamic and Fixed Allocation or only supports Exclusive Allocation

Bits
1
0   Dynamic and Fixed Allocation not supported
1   Dynamic and Fixed allocation supported

EGPRS Support (1 bit field)
This field indicates whether or not the MS supports EGPRS

Bit
1
0   EGPRS not supported
1   EGPRS supported

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.007	**CR**	**015**	Current Version:	**3.3.1**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	**CN #8**	for approval	**X**	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network ☐
(at least one should be marked with an X)

Source:	Vodafone AirTouch	**Date:**	17th May 2000

Subject:	New PD for LLC for use by DTM (Dual Transfer Mode) mobiles

Work item:	GPRS

Category: F   Correction
         A   Corresponds to a correction in an earlier release
(only one category   B   Addition of feature
shall be marked   C   Functional modification of feature   **X**
with an X)   D   Editorial modification

Release: Phase 2   ☐
         Release 96   ☐
         Release 97   ☐
         Release 98   ☐
         Release 99   **X**
         Release 00

Reason for change:	DTM mobiles can use the main DCCH to pass packetised user data to the network. In order for the network to recognise that these packets should be sent to the PCU, there needs to be a new PD for LLC.

Clauses affected:	

Other specs affected:

Other 3G core specifications	☐	→ List of CRs:	
Other GSM core specifications	☐	→ List of CRs:	
MS test specifications	☐	→ List of CRs:	
BSS test specifications	☐	→ List of CRs:	
O&M specifications	☐	→ List of CRs:	

Other comments:	

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<--------- double-click here for help and instructions on how to create a CR.

4.3.4   Contents of layer 3 related Technical Specifications

- The Radio Resource (RR) management protocol is defined in GSM 04.08:

- the Mobility Management (MM) protocol is defined in TS 24.008;

- the Session Management (SM) protocol is defined in TS 24.008;

- the Call Control (CC) protocol is defined in TS 24.008;

- the Supplementary Services (SS) protocol is defined in TS 24.010, TS 24.08x and TS 24.09x;

- the Short Message Service (SMS) protocol is defined in TS 24.011;

- the Group Call Control (GCC) protocol is defined in GSM 04.68;

- the protocols for Packet Data on Signalling channels (PDS), PDSS1 ~~and PDSS2, are~~is defined in GSM 04.63;

- the Logical Link Control (LLC) protocol is defined in GSM 04.64;

- the GPRS Radio Resource (GRR) protocol is defined in GSM 04.60 and TS 24.008.

- the CTS Radio Resource (CTS-RR) sub-protocol is defined in GSM 04.56;

- the CTS Mobility Management (CTS-MM) sub-protocol is defined in GSM 04.56;

- the CTS additions to the Call Control (CC) protocol are defined in GSM 04.56.

- the Location Services (LCS) protocol is defined in GSM 03.71 and GSM 04.71.

Next Modified Section

11.2.3   Imperative part of a standard L3 message

The imperative part of a standard L3 message is composed a header possibly followed by mandatory standard IEs having the format V or LV.

11.2.3.1   Header

The header of a standard L3 message is composed of two octets, and structured in three main parts, the protocol discriminator (1/2 octet), a message type octet, and a half octet used in some cases as a Transaction Identifier, in some other cases as a sub-protocol discriminator, and called skip indicator otherwise.

11.2.3.1.1   Protocol discriminator

Bits 1 to 4 of the first octet of a standard L3 message contain the protocol discriminator (PD) information element. The PD identifies the L3 protocol to which the standard layer 3 message belongs. The correspondence between L3 protocols and PDs is one-to-one.

For future evolution an extension mechanism is foreseen which allows the use of protocol discriminators with one octet length, where bits 4 to one are coded as 1 1 1 0. Messages of such protocols may not be standard L3 messages. In particular, the rest of the header may not respect the structure described in this sub-clause.

The PD can take the following values:

Table 11.2: Protocol discriminator values

bits 4 3 2 1	
0 0 0 0	group call control
0 0 0 1	Broadcast call control
0 0 1 0	PDSS1
0 0 1 1	call control; call related SS messages
0 1 0 0	~~PDSS2~~LLC messages
0 1 0 1	mobility management messages
0 1 1 0	radio resources management messages
1 0 0 0	GPRS mobility management messages
1 0 0 1	SMS messages
1 0 1 0	GPRS session management messages
1 0 1 1	non call related SS messages
1 1 0 0	Location services
1 1 1 0	reserved for extension of the PD to one octet length
1 1 1 1	reserved for tests procedures described in GSM 11.10

If the network receives, on a SAP where it expects standard L3 messages, a message with a protocol discriminator different from those specified in table 11.2, the network may ignore the message or initiate the channel release procedure defined in GSM 04.08.

If the Mobile Station receives, on a SAP where it expects standard L3 messages, a standard L3 message with a protocol discriminator different from those specified in table 11.2, or for a protocol that it does not support, the Mobile Station shall ignore the message.

3GPP/SMG Meeting TSG-CN-WG1 #12   *Document*
Hawaii, USA, 22 – 26 May 2000

CHANGE REQUEST

| **24.008** CR | **193r1** | Current Version: | 3.3.1 |

For submission to: TSG CN#8   for approval **X**   strategic ☐
                                       for information ☐   non-strategic **X**

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**

Source:	Nokia	**Date:** 25.05.00
Subject:	MODIFY PDP CONTEXT REJECT –message definition	
Work item:	GPRS	

Category: F Correction   **X**   **Release:** Phase 2   ☐
               A Corresponds to a correction in an earlier release ☐   Release 96   ☐
               B Addition of feature   ☐   Release 97   ☐
               C Functional modification of feature   ☐   Release 98   ☐
               D Editorial modification   ☐   Release 99   **X**
                                                                              Release 00

Reason for change:
It is possible for MS to request modification of QoS and TFT at one MODIFY PDP CONTEXT REQUEST –message. If neither requested TFT nor requested QoS are available, the network should send MODIFY PDP CONTEXT REJECT –message to the MS.

Current message definition in 24.008 states that if the requested QoS is not available, the MODIFY PDP CONTEXT REJECT –message should not be sent and this sentence should be removed.

Clauses affected: 9.5.13

Other specs affected:
Other 3G core specifications	☐	→ List of CRs:
Other GSM core specifications	☐	→ List of CRs:
MS test specifications	☐	→ List of CRs:
BSS test specifications	☐	→ List of CRs:
O&M specifications	☐	→ List of CRs:

Other comments: This CR does not cause changes to chapter 6.1.3.3 where PDP Context Modification procedure is described

9.5.13   Modify PDP Context Reject

This message is sent by the network to the UE to reject the requested modification of the TFT. The network should not send a MODIFY PDP CONTEXT REJECT message if <u>only</u> the requested QoS is not available. <u>If a TFT modification was requested and the requested new TFT is not available then MODIFY PDP CONTEXT REJECT shall be sent.</u> See Table 9.5.13/TS 24.008.

Message type: MODIFY PDP CONTEXT REJECT

Significance: global

Direction: network to MS

Table 9.5.13/TS 24.008: MODIFY PDP CONTEXT REJECT message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2-3/2
	Modify PDP Context Reject	Message type 10.4	M	V	1
	SM cause	SM Cause 10.5.6.6	M	V	1

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

04.08	CR	**A1029r1**	Current Version:	**6.10.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to: **CN#8**   for approval **X**   strategic ☐   *(for SMG*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐   *Use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network ☐
(at least one should be marked with an X)

Source:	Alcatel, Siemens	**Date:**
Subject:	Clarification on local and foreign TLLI management	
Work item:	GPRS	

Category: F   Correction   **X**   **Release:**   Phase 2 ☐
            A   Corresponds to a correction in an earlier release ☐   Release 96 ☐
(only one category   B   Addition of feature ☐   Release 97 **X**
shall be marked   C   Functional modification of feature ☐   Release 98 ☐
with an X)   D   Editorial modification ☐   Release 99 ☐
                                                Release 00 ☐

Reason for change:

GSM 03.60, section 6.5, deals with TLLI management in the MS as follows :

"At the RLC/MAC layer, the MS shall identify itself with a Local or Foreign TLLI if the MS is already GPRS-attached and is performing an IMSI attach. Otherwise, the MS shall identify itself with a Foreign TLLI, or a Random TLLI if a valid P-TMSI is not available. The Foreign or Random TLLI is used as an identifier during the attach procedure until a new P-TMSI is allocated."

Also, GSM 03.60, section 14.3 indicates :

"If the MS has a valid P-TMSI associated with the RA where the MS is currently located, then the MS shall use a Local TLLI derived from its P-TMSI, unless the MS performs a GPRS attach.

If the MS does not have a valid P-TMSI associated with the current RA, or if the MS performs a GPRS attach, then it shall derive a Foreign TLLI from its P-TMSI, or allocate a Random TLLI if no valid P-TMSI is available."

A local TLLI is then only valid in the RA associated with the P-TMSI.

GSM 04.08, section 4.7.1.4 is inconsistent with this description because it only deals with the ATTACH REQUEST (respectively ROUTING AREA UPDATE REQUEST) message and do not refer to the Attach (respectively Routing Area Update) procedure as a whole. Therefore, some MS may send any other message during these procedures (as Authentication and Ciphering Response or Identity Response) with a local TLLI and may wait for messages on local TLLI, which may lead the procedure to fail and may cause some collision cases. To prevent this, this CR tries to clarify the TLLI handling described in GSM 04.08 during the Attach or during the Routing Area Update procedure when a foreign TLLI shall be used.

Clauses affected:

Other comments: Following collision have been identified in case Foreign TLLI in not used for the procedures inside the Attach (or RAU) procedure:

- Consider an MS1 that is successfully attached to SGSN1, P-TMSI1 is allocated to that MS1.

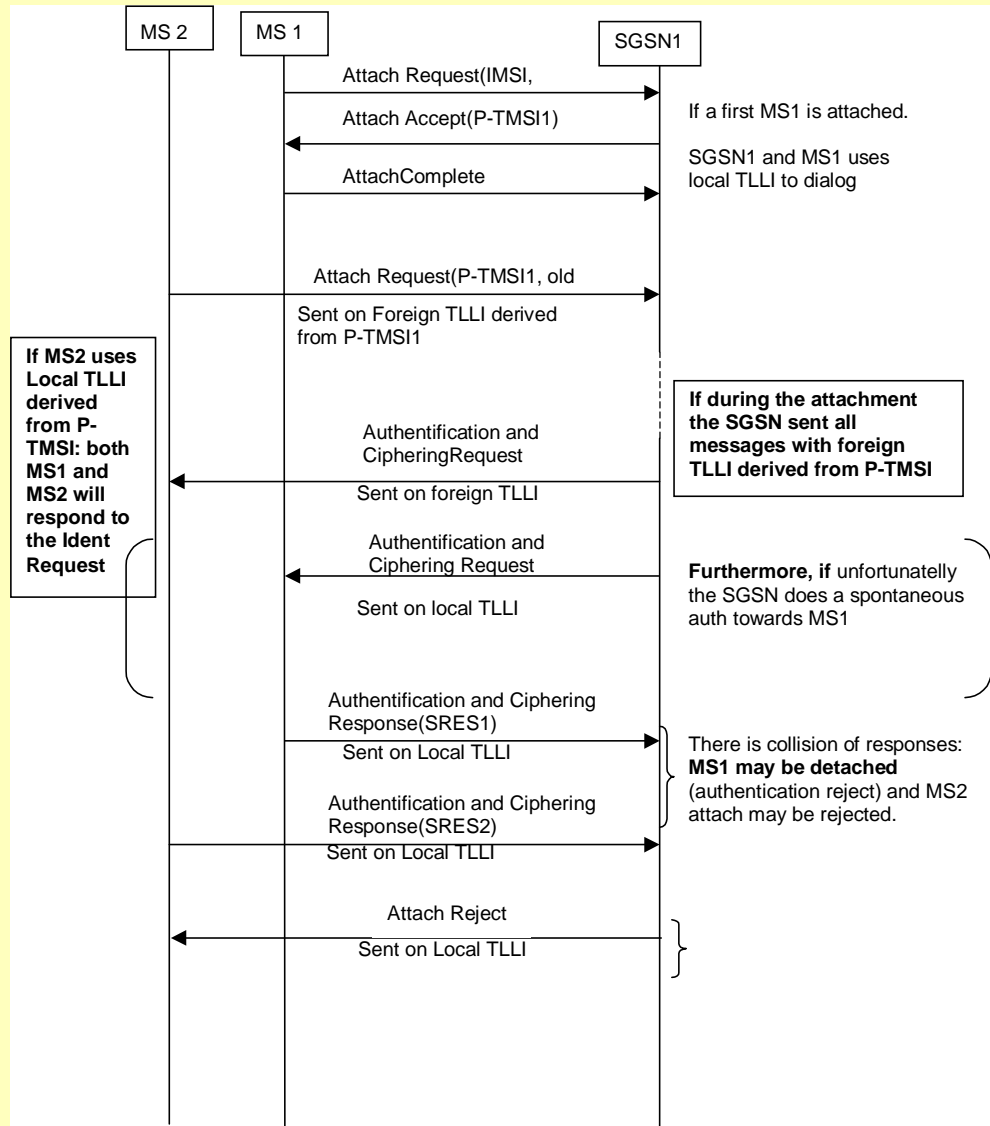- If an MS2 that, unfortunatly, has a P-TMSI with same value as P-TMSI1 tries to attach to SGSN1:

Figure 1 If SGSN and MS uses local TLLI while P-TMSI is not validated

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4.7.1.4   Radio resource sublayer address handling

While a packet TMSI (P-TMSI) is used in the GMM sublayer for identification of an MS, a temporary logical link identity (TLLI) is used for addressing purposes at the RR sublayer. This section describes how the RR addressing is managed by GMM. For the detailed coding of the different TLLI types and how a TLLI can be derived from a P-TMSI, see GSM 03.03 [10].

Two cases can be distinguished:

- a valid P-TMSI is available in the MS; or

- no valid P-TMSI is available in the MS

NOTE: For anonymous access, the RR address assignment is handled by the SM sublayer as described in section 6.1.1.1.

i)   valid P-TMSI available

If the MS has stored a valid P-TMSI, the MS shall derive a foreign TLLI from that P-TMSI and shall use it for transmission of the:

- ATTACH REQUEST message of any GPRS combined/non-combined attach procedure; ~~and~~other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI until the ATTACH ACCEPT message or the ATTACH REJECT message is received; and

- ROUTING AREA UPDATE REQUEST message of a combined/non-combined RAU procedure if the MS has entered a new routing area, or if the GPRS update status is not equal to GU1 UPDATED. Other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI, until the ROUTING AREA UPDATE ACCEPT message or the ROUTING AREA UPDATE REJECT message is received.

Any other GMM message is transmitted using a local TLLI derived from the stored P-TMSI. This includes a ROUTING AREA UPDATE REQUEST message that is sent within a periodic routing area update procedure.

ii) no valid P-TMSI available

When the MS has not stored a valid P-TMSI, i.e. the MS is not attached to GPRS, the MS shall use a randomly selected random TLLI for transmission of the:

- ATTACH REQUEST message of any combined/non-combined GPRS attach procedure.

The same randomly selected random TLLI value shall be used for all message retransmission attempts and for the cell updates within one attach attempt.

Upon receipt of an ATTACH REQUEST message, the network assigns a P-TMSI to the MS, derives a local TLLI from the assigned P-TMSI, and transmits the assigned P-TMSI to the MS.

Upon receipt of the assigned P-TMSI, the MS shall derive the local TLLI from this P-TMSI and shall use it for addressing at lower layers.

In both cases, the MS shall acknowledge the reception of the assigned P-TMSI to the network. After receipt of the acknowledgement, the network shall use the local TLLI for addressing at lower layers.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

04.08	**CR**	**A1027r1**	Current Version:	**7.7.0**	

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	CN#8	for approval	**X**	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic		*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network ☐
(at least one should be marked with an X)

Source:	Alcatel, Siemens		**Date:**	

Subject:	Clarification on local and foreign TLLI management

Work item:	GPRS

Category: F   Correction

			Release:	Phase 2	
	A Corresponds to a correction in an earlier release	**X**		Release 96	
(only one category	B Addition of feature			Release 97	
shall be marked	C Functional modification of feature			Release 98	**X**
with an X)	D Editorial modification			Release 99	
				Release 00	

Reason for change:

GSM 03.60, section 6.5, deals with TLLI management in the MS as follows :

"At the RLC/MAC layer, the MS shall identify itself with a Local or Foreign TLLI if the MS is already GPRS-attached and is performing an IMSI attach. Otherwise, the MS shall identify itself with a Foreign TLLI, or a Random TLLI if a valid P-TMSI is not available. The Foreign or Random TLLI is used as an identifier during the attach procedure until a new P-TMSI is allocated."

Also, GSM 03.60, section 14.3 indicates :

"If the MS has a valid P-TMSI associated with the RA where the MS is currently located, then the MS shall use a Local TLLI derived from its P-TMSI, unless the MS performs a GPRS attach.

If the MS does not have a valid P-TMSI associated with the current RA, or if the MS performs a GPRS attach, then it shall derive a Foreign TLLI from its P-TMSI, or allocate a Random TLLI if no valid P-TMSI is available."

A local TLLI is then only valid in the RA associated with the P-TMSI.

GSM 04.08, section 4.7.1.4 is inconsistent with this description because it only deals with the ATTACH REQUEST (respectively ROUTING AREA UPDATE REQUEST) message and do not refer to the Attach (respectively Routing Area Update) procedure as a whole. Therefore, some MS may send any other message during these procedures (as Authentication and Ciphering Response or Identity Response) with a local TLLI and may wait for messages on local TLLI, which may lead the procedure to fail and may cause some collision cases. To prevent this, this CR tries to clarify the TLLI handling described in GSM 04.08 during the Attach or during the Routing Area Update procedure when a foreign TLLI shall be used.

Clauses affected:

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

Following collision have been identified in case Foreign TLLI in not used for the procedures inside the Attach (or RAU) procedure:

- Consider an MS1 that is successfully attached to SGSN1, P-TMSI1 is allocated to that MS1.

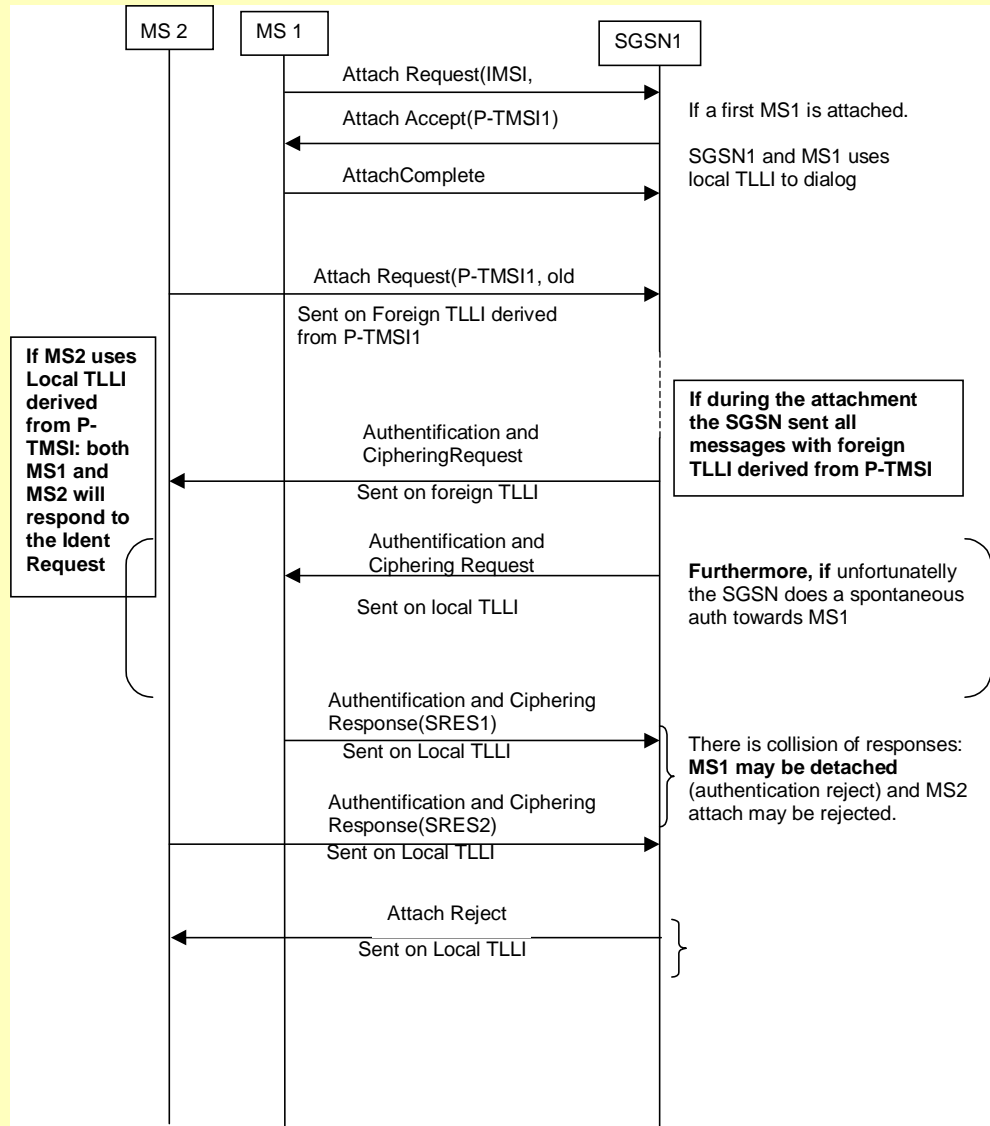- If an MS2 that, unfortunatly, has a P-TMSI with same value as P-TMSI1 tries to attach to SGSN1:

MS 2   MS 1   SGSN1

Attach Request(IMSI,   →   If a first MS1 is attached.

Attach Accept(P-TMSI1)   ←   SGSN1 and MS1 uses
                                                 local TLLI to dialog
AttachComplete   →

Attach Request(P-TMSI1, old   →

Sent on Foreign TLLI derived
from P-TMSI1

If MS2 uses Local TLLI derived from P-TMSI: both MS1 and MS2 will respond to the Ident Request

Authentification and
CipheringRequest   ←   **If during the attachment the SGSN sent all messages with foreign TLLI derived from P-TMSI**

Sent on foreign TLLI

Authentification and
Ciphering Request   ←   **Furthermore, if** unfortunatelly the SGSN does a spontaneous auth towards MS1

Sent on local TLLI

Authentification and Ciphering
Response(SRES1)   →

Sent on Local TLLI   There is collision of responses: **MS1 may be detached** (authentication reject) and MS2 attach may be rejected.

Authentification and Ciphering
Response(SRES2)   →

Sent on Local TLLI

Attach Reject   ←

Sent on Local TLLI

Figure 1 If SGSN and MS uses local TLLI while P-TMSI is not validated

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<--------- double-click here for help and instructions on how to create a CR.

4.7.1.4 Radio resource sublayer address handling

While a packet TMSI (P-TMSI) is used in the GMM sublayer for identification of an MS, a temporary logical link identity (TLLI) is used for addressing purposes at the RR sublayer. This section describes how the RR addressing is managed by GMM. For the detailed coding of the different TLLI types and how a TLLI can be derived from a P-TMSI, see GSM 03.03 [10].

Two cases can be distinguished:

- a valid P-TMSI is available in the MS; or

- no valid P-TMSI is available in the MS

NOTE: For anonymous access, the RR address assignment is handled by the SM sublayer as described in section 6.1.1.1.

i) valid P-TMSI available

If the MS has stored a valid P-TMSI, the MS shall derive a foreign TLLI from that P-TMSI and shall use it for transmission of the:

- ATTACH REQUEST message of any GPRS combined/non-combined attach procedure; ~~and~~other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI until the ATTACH ACCEPT message or the ATTACH REJECT message is received; and

- ROUTING AREA UPDATE REQUEST message of a combined/non-combined RAU procedure if the MS has entered a new routing area, or if the GPRS update status is not equal to GU1 UPDATED. Other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI, until the ROUTING AREA UPDATE ACCEPT message or the ROUTING AREA UPDATE REJECT message is received.

Any other GMM message is transmitted using a local TLLI derived from the stored P-TMSI. This includes a ROUTING AREA UPDATE REQUEST message that is sent within a periodic routing area update procedure.

ii) no valid P-TMSI available

When the MS has not stored a valid P-TMSI, i.e. the MS is not attached to GPRS, the MS shall use a randomly selected random TLLI for transmission of the:

- ATTACH REQUEST message of any combined/non-combined GPRS attach procedure.

The same randomly selected random TLLI value shall be used for all message retransmission attempts and for the cell updates within one attach attempt.

Upon receipt of an ATTACH REQUEST message, the network assigns a P-TMSI to the MS, derives a local TLLI from the assigned P-TMSI, and transmits the assigned P-TMSI to the MS.

Upon receipt of the assigned P-TMSI, the MS shall derive the local TLLI from this P-TMSI and shall use it for addressing at lower layers.

In both cases, the MS shall acknowledge the reception of the assigned P-TMSI to the network. After receipt of the acknowledgement, the network shall use the local TLLI for addressing at lower layers.

CHANGE REQUEST

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24.008	CR	**222r1**	Current Version:	3.3.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to: CN#8   for approval **X**   strategic ☐ *(for SMG use only)*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

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Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network ☐
(at least one should be marked with an X)

Source:	Alcatel, Siemens
Subject:	Clarification on local and foreign TLLI management
Work item:	GPRS

Date:

Category:
F   Correction
A   Corresponds to a correction in an earlier release **X**
(only one category shall be marked with an X)
B   Addition of feature
C   Functional modification of feature
D   Editorial modification

Release:
Phase 2 ☐
Release 96 ☐
Release 97 ☐
Release 98 ☐
Release 99 **X**
Release 00 ☐

Reason for change:

GSM 03.60, section 6.5, deals with TLLI management in the MS as follows :

"At the RLC/MAC layer, the MS shall identify itself with a Local or Foreign TLLI if the MS is already GPRS-attached and is performing an IMSI attach. Otherwise, the MS shall identify itself with a Foreign TLLI, or a Random TLLI if a valid P-TMSI is not available. The Foreign or Random TLLI is used as an identifier during the attach procedure until a new P-TMSI is allocated."

Also, GSM 03.60, section 14.3 indicates :

"If the MS has a valid P-TMSI associated with the RA where the MS is currently located, then the MS shall use a Local TLLI derived from its P-TMSI, unless the MS performs a GPRS attach.

If the MS does not have a valid P-TMSI associated with the current RA, or if the MS performs a GPRS attach, then it shall derive a Foreign TLLI from its P-TMSI, or allocate a Random TLLI if no valid P-TMSI is available."

A local TLLI is then only valid in the RA associated with the P-TMSI.

GSM 04.08, section 4.7.1.4 is inconsistent with this description because it only deals with the ATTACH REQUEST (respectively ROUTING AREA UPDATE REQUEST) message and do not refer to the Attach (respectively Routing Area Update) procedure as a whole. Therefore, some MS may send any other message during these procedures (as Authentication and Ciphering Response or Identity Response) with a local TLLI and may wait for messages on local TLLI, which may lead the procedure to fail and may cause some collision cases. To prevent this, this CR tries to clarify the TLLI handling described in GSM 04.08 during the Attach or during the Routing Area Update procedure when a foreign TLLI shall be used.

Clauses affected:

Other comments:

Following collision have been identified in case Foreign TLLI in not used for the procedures inside the Attach (or RAU) procedure:

- Consider an MS1 that is successfully attached to SGSN1, P-TMSI1 is allocated to that MS1.

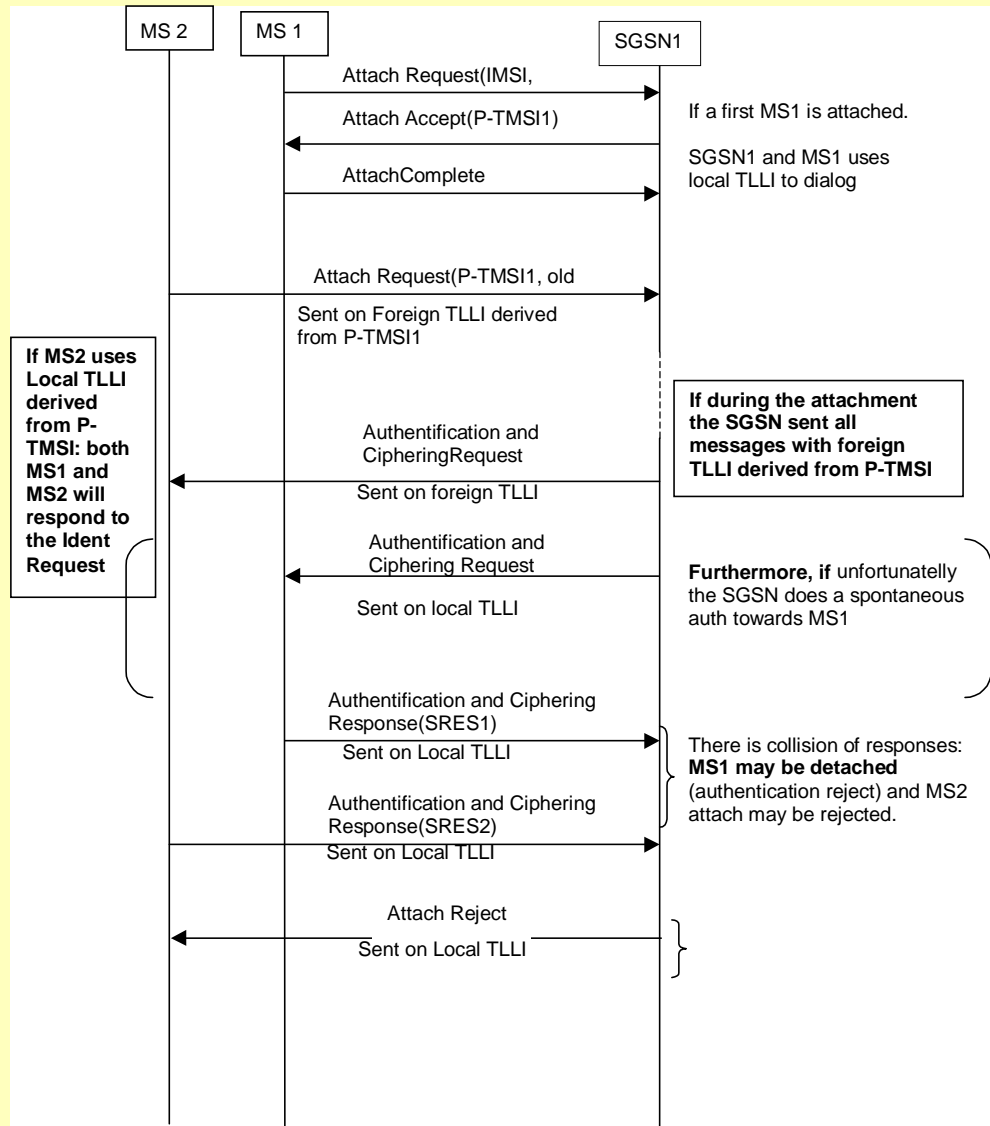- If an MS2 that, unfortunatly, has a P-TMSI with same value as P-TMSI1 tries to attach to SGSN1:

Figure 1 If SGSN and MS uses local TLLI while P-TMSI is not validated

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.7.1.4 Radio resource sublayer address handling

In GSM, while a packet TMSI (P-TMSI) is used in the GMM sublayer for identification of an MS, a temporary logical link identity (TLLI) is used for addressing purposes at the RR sublayer..

In UMTS a Radio Network Temporary Identity (RNTI) identifies a UMTS user between the MS and the UTRAN. The relationship between RNTI and IMSI is known only in the MS and in the UTRAN, see TS 25.301[10]

4.7.1.4.1 Radio resource sublayer address handling (GSM only)

This section describes how the RR addressing is managed by GMM. For the detailed coding of the different TLLI types and how a TLLI can be derived from a P-TMSI, see TS 23.003 [10].

Two cases can be distinguished:

- a valid P-TMSI is available in the MS; or

- no valid P-TMSI is available in the MS

i) valid P-TMSI available

If the MS has stored a valid P-TMSI, the MS shall derive a foreign TLLI from that P-TMSI and shall use it for transmission of the:

- ATTACH REQUEST message of any GPRS combined/non-combined attach procedure; andother GMM messages sent during this procedure shall be transmitted using the same foreign TLLI until the ATTACH ACCEPT message or the ATTACH REJECT message is received; and

- ROUTING AREA UPDATE REQUEST message of a combined/non-combined RAU procedure if the MS has entered a new routing area, or if the GPRS update status is not equal to GU1 UPDATED. Other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI, until the ROUTING AREA UPDATE ACCEPT message or the ROUTING AREA UPDATE REJECT message is received.

Any other GMM message is transmitted using a local TLLI derived from the stored P-TMSI. This includes a ROUTING AREA UPDATE REQUEST message that is sent within a periodic routing area update procedure.

ii) no valid P-TMSI available

When the MS has not stored a valid P-TMSI, i.e. the MS is not attached to GPRS, the MS shall use a randomly selected random TLLI for transmission of the:

- ATTACH REQUEST message of any combined/non-combined GPRS attach procedure.

The same randomly selected random TLLI value shall be used for all message retransmission attempts and for the cell updates within one attach attempt.

Upon receipt of an ATTACH REQUEST message, the network assigns a P-TMSI to the MS, derives a local TLLI from the assigned P-TMSI, and transmits the assigned P-TMSI to the MS.

Upon receipt of the assigned P-TMSI, the MS shall derive the local TLLI from this P-TMSI and shall use it for addressing at lower layers.

In both cases, the MS shall acknowledge the reception of the assigned P-TMSI to the network. After receipt of the acknowledgement, the network shall use the local TLLI for addressing at lower layers.

3GPP CN WG1 Meeting #12

Hawaii, USA, 22- 26 May 2000

Document ~~N1-000726~~
N1-000763
*e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx*

CHANGE REQUEST

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24.007 CR	**A014r2**	Current Version:	3.3.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	CN #8	for approval	X	Strategic		(for SMG
list expected approval meeting # here ↑		for information		non-strategic		use only)

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects:
(at least one should be marked with an X)
(U)SIM ☐ ME **X** UTRAN / Radio ☐ Core Network **X**

Source:	Ericsson/Siemens		**Date:**	2000-05-18

Subject:	Change of the GMM Ready Timer behaviour

Work item:	GPRS

Category: F Correction   **X**   **Release:**   Phase 2
(only one category shall be marked with an X)
A Corresponds to a correction in an earlier release   Release 96
B Addition of feature   Release 97
C Functional modification of feature   Release 98
D Editorial modification   Release 99   **X**
Release 00

Reason for change:

The MS/SGSN shall restart the GMM READY timer at transmission/reception of any LLC frame, including an LLC frame without an information field transmitted in order to perform cell update.

If the user is travelling around in an urban area, where the cell size is small, the READY timer will be restarted, even if there is no active user-data transmission. Thus, the MS and SGSN will remain in GMM ready state for considerably longer than is necessary, and the MS will continue to perform cell updates.

Frequent cell updates will lead to:
- increase of network load;
- waste of radio resources;
- significant increase of MS battery consumption, due to increased signalling and time spent in non-DRX mode.

In order to overcome this problem, it is proposed to introduce an optional cell update procedure where the READY timer will not be started if the LLC frame transmitted (by the MS)/received (by the SGSN) contains a cell update.

This proposed change is optional for both the network and the MS.

Clauses affected: Annex C

Other specs affected:

Other 3G core specifications	☐	→ List of CRs:	
Other GSM core specifications	☐	→ List of CRs:	
MS test specifications	☐	→ List of CRs:	
BSS test specifications	☐	→ List of CRs:	
O&M specifications	☐	→ List of CRs:	

Other   The proposed solution introduces a "Cell Notification" (which is in fact an optimised Cell

comments: Update Procedure) into MS and SGSN. The possibility to use the Cell Notification will be indicated by the network and shall be used by the MS when the MS does support it. The update will be triggered by the LLC NULL frame (introduced in 04.64) which is only allowed to be send by the MS if the network indicates the Cell Notification.

The feature is mandatory for R99 but a R99 network must be able to handle pre R99 MS which do not support Cell Notification.

Indication of the Cell Notification

A new, optional information element (optional on syntax level but on semantic level mandatory for R99) is introduced into the ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT message to indicate the ability of the network to support the Cell Notification.

If both the MS and SGSN support the Cell Notification, and the ATTACH ACCEPT message or ROUTING AREA UPDATE ACCEPT message contains a new value of the READY timer, the MS shall send any LLC frame except the LLC NULL frame in order to start the READY timer (LLC NULL frame can not be sent because it does not trigger the start of the READY timer).
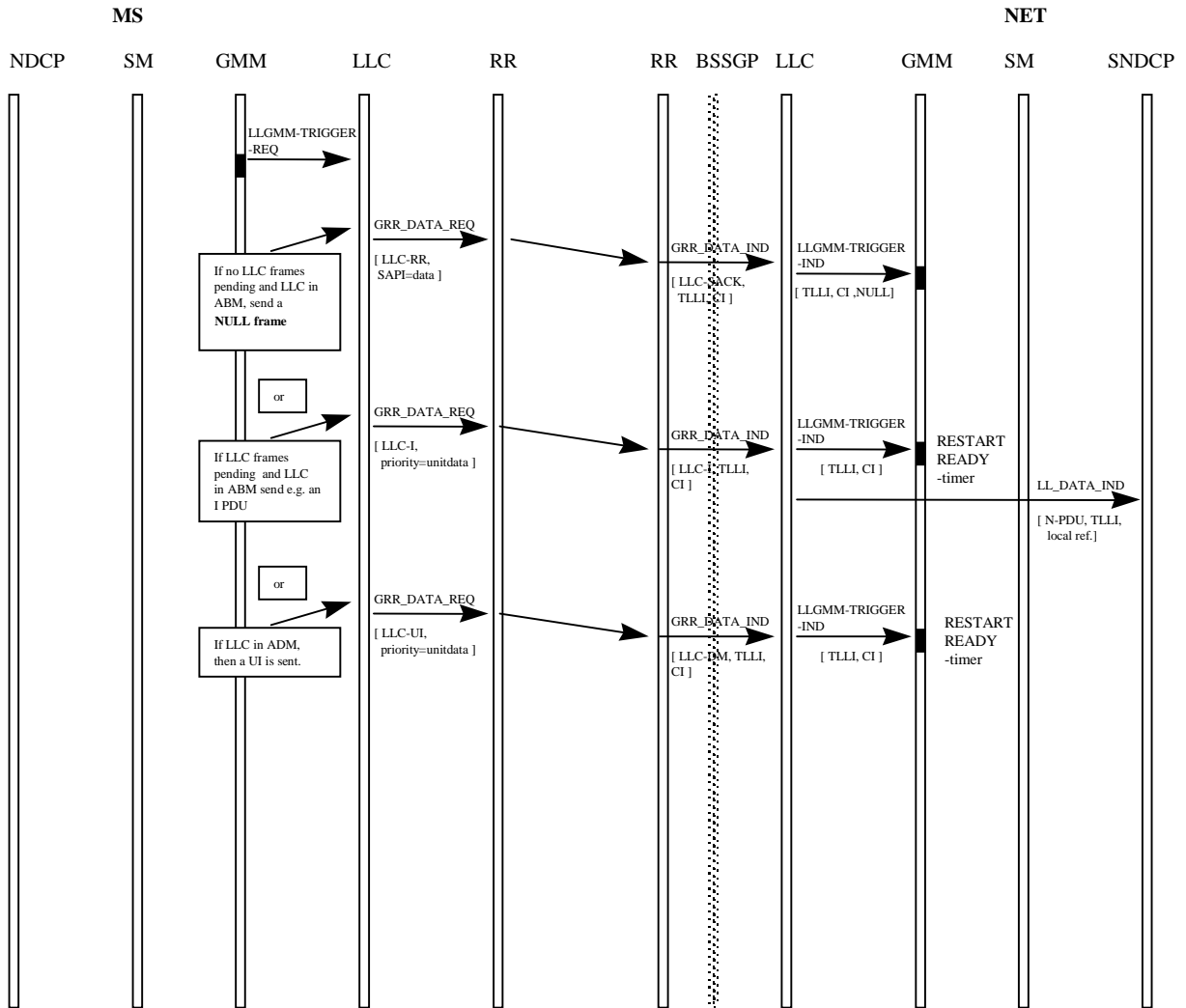
Behaviour at Cell Notification (new cell is entered)

A LLC NULL frame is introduced at the LLC layer. If both the MS and SGSN support the Cell Notification, an MS shall transmit the LLC NULL frame in order to indicate a cell change to the network. The MS shall not start the READY timer as a result of transmitting the LLC NULL frame. Similarly, the SGSN shall not start the READY timer as a result of receiving LLC NULL frame.

Further:

An MS shall not transmit LLC NULL frame as a response to paging for PS services. If the MS does not support the Cell Notification but the SGSN indicates the ability to support them then the behaviour at cell update remains as currently specified.

C.18 CELL Notification

MS   **NET**

| NDCP | SM | GMM | LLC | RR | RR | BSSGP | LLC | GMM | SM | SNDCP |

LLGMM-TRIGGER
-REQ

GRR_DATA_REQ

[LLC-RR,
SAPI=data]

GRR_DATA_IND

[LLC-SACK,
TLLI, CI]

LLGMM-TRIGGER
-IND

[TLLI, CI ,NULL]

If no LLC frames
pending and LLC in
ABM, send a
NULL frame

or

GRR_DATA_REQ

[LLC-I,
priority=unitdata]

GRR_DATA_IND

[LLC-I, TLLI,
CI]

LLGMM-TRIGGER
-IND

[TLLI, CI]

RESTART
READY
-timer

LL_DATA_IND

[N-PDU, TLLI,
local ref.]

If LLC frames
pending and LLC
in ABM send e.g. an
I PDU

or

GRR_DATA_REQ

[LLC-UI,
priority=unitdata]

GRR_DATA_IND

[LLC-UM, TLLI,
CI]

LLGMM-TRIGGER
-IND

[TLLI, CI]

RESTART
READY
-timer

If LLC in ADM,
then a UI is sent.

| No further changes. |

CHANGE REQUEST

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24.008	CR	208r3	Current Version:	3.3.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   ↑ *CR number as allocated by MCC support team*

For submission to:	CN #8	for approval	X		Strategic		*(for SMG*
list expected approval meeting # here ↑		for information			non-strategic	X	*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects:	(U)SIM		ME	X	UTRAN / Radio		Core Network	X
(at least one should be marked with an X)								

Source:	Ericsson/Siemens			**Date:**	2000-05-18

Subject:	Change of the GMM Ready Timer behaviour

Work item:	GPRS

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	The MS/SGSN shall restart the GMM READY timer at transmission/reception of any LLC frame, including an LLC frame without an information field transmitted in order to perform cell update.
	If the user is travelling around in an urban area, where the cell size is small, the READY timer will be restarted, even if there is no active user-data transmission. Thus, the MS and SGSN will remain in GMM ready state for considerably longer than is necessary, and the MS will continue to perform cell updates.
	Frequent cell updates will lead to:
	- increase of network load;
	- waste of radio resources;
	- significant increase of MS battery consumption, due to increased signalling and time spent in non-DRX mode.
	In order to overcome this problem, it is proposed to introduce an optional cell update procedure where the READY timer will not be started if the LLC frame transmitted (by the MS)/received (by the SGSN) contains a cell update.
	This proposed change is optional for both the network and the MS.

Clauses affected:	4.7.1.2, 4.7.2.1.1, 4.7.3.1.1, 4.7.3.1.3, 4.7.5.1.1, 4.7.5.1.3, 9.4.1, 9.4.2, 9.4.14, 9.4.15, 9.4.23, 10.4, 10.5.5.21

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other	The proposed solution introduces a "Cell Notification" (which is in fact an optimised Cell

comments: Update Procedure) into MS and SGSN. The possibility to use the Cell Notification will be indicated by the network and shall be used by the MS when the MS does support it. The update will be triggered by the LLC NULL frame (introduced in 04.64) which is only allowed to be send by the MS if the network indicates the Cell Notification.

The feature is mandatory for R99 but a R99 network must be able to handle pre R99 MS which do not support Cell Notification.

Indication of the Cell Notification

A new, optional information element (optional on syntax level but on semantic level mandatory for R99) is introduced into the ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT message to indicate the ability of the network to support the Cell Notification.

If both the MS and SGSN support the Cell Notification, and the ATTACH ACCEPT message or ROUTING AREA UPDATE ACCEPT message contains a new value of the READY timer, the MS shall send any LLC frame except the LLC NULL frame in order to start the READY timer (LLC NULL frame can not be sent because it does not trigger the start of the READY timer).

Behaviour at Cell Notification (new cell is entered)

A LLC NULL frame is introduced at the LLC layer. If both the MS and SGSN support the Cell Notification, an MS shall transmit the LLC NULL frame in order to indicate a cell change to the network. The MS shall not start the READY timer as a result of transmitting the LLC NULL frame. Similarly, the SGSN shall not start the READY timer as a result of receiving LLC NULL frame.

Further:

An MS shall not transmit LLC NULL frame as a response to paging for PS services. If the MS does not support the Cell Notification but the SGSN indicates the ability to support them then the behaviour at cell update remains as currently specified.

*** First Modification ***

2.2.2   Vocabulary

The following terms are used in this Technical Specification:

> :
>
> :

- **SIM,** Subscriber Identity Module (see TS GSM 02.17). This specification makes no distinction between SIM and USIM.

- **MS,** Mobile Station. This specification makes no distinction between MS and UE.

- **Cell Notification** is an (optimised) variant of the Cell Update Procedure which uses the LLC NULL frame for cell change notification which does not trigger the restart of the READY timer

*** Next Modification ***

4.7.2   GPRS Mobility management timers and UMTS PS signalling connection control

4.7.2.1   READY timer behaviour

4.7.2.1.1   READY timer behaviour (GSM only)

The READY timer, T3314 is used in the MS and in the network per each assigned P-TMSI to control the cell updating procedure.

When the READY timer is running or has been deactivated the MS shall perform cell update each time a new cell is selected (see TS 23.022 [14]). If a routing area border is crossed, a routing area updating procedure shall be performed instead of a cell update.

When the READY timer has expired the MS shall:

- perform the routing area updating procedure when a routing area border is crossed;

- not perform a cell update when a new cell is selected.

All other GMM procedures are not affected by the READY timer.

The READY timer is started:

- in the MS when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been transmitted on the radio interface; and

- in the network when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been successfully received by the network.

Within GMM signalling procedures the network includes a 'force to standby' information element, in order to indicate whether or not the READY timer shall be stopped when returning to the GMM-REGISTERED state. If the 'force to standby' information element is received within more than one message during a ongoing GMM specific procedure, the last one received shall apply. If the READY timer is deactivated and the network indicates 'force to standby' with the 'force to standby' information element, this shall not cause a modification of the READY timer.

The READY timer is not affected by state transitions to and from the GMM-REGISTERED.SUSPENDED sub-state.

The value of the READY timer may be negotiated between the MS and the network using the GPRS attach or GPRS routing area updating procedure.

- If the MS wishes to indicate its preference for a READY timer value it shall include the preferred values into the ATTACH REQUEST and/or ROUTING AREA UPDATE REQUEST messages. The preferred values may be smaller, equal to or greater than the default values or may be equal to the value requesting the READY Timer function to be deactivated.

- Regardless of whether or not a timer value has been received by the network in the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST messages, the network may include a timer value for the READY timer (different or not from the default value) into the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT messages, respectively. If the READY Timer value was included, it shall be applied for the GMM context by the network and by the MS.

- When the MS proposes a READY Timer value and the Network does not include any READY Timer Value in its answer, then the value proposed by the MS shall be applied for the GMM context by the Network and by the MS.

- When neither the MS nor the Network proposes a READY Timer value into the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message, then the default value shall be used.

If the negotiated READY timer value indicates that the ready timer function is deactivated, the READY timer shall always run without expiry. If the negotiated READY timer value indicates that the ready timer function is deactivated, and within the same procedure the network indicates 'force to standby' with the 'force to standby' information element, the READY timer shall always run without expiry. If the negotiated READY timer value is set to zero, READY timer shall be stopped immediately.

To account for the LLC frame uplink transmission delay, the READY timer value should be slightly shorter in the network than in the MS. This is a network implementation issue.

If a new READY timer value is negotiated, the MS shall upon the reception of the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message perform a initial cell update (either by transmitting a LLC frame or, if required, a ATTACH COMPLETE or ROUTING AREA UPDATE COMPLETE message), in order to apply the new READY timer value immediately. If both the network and the MS supports the Cell Notification, the initial cell update shall use any LLC frame except the LLC NULL frame. If the new READY timer value is set to zero or if the network indicates 'force to standby' with the 'force to standby' IE, the initial cell update should not be done.

*** Next Modification ***

4.7.3   GPRS attach procedure

4.7.3.1   GPRS attach procedure for GPRS services

4.7.3.1.1   GPRS attach procedure initiation

4.7.3.1.2   GMM common procedure initiation

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. 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 section 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 RR connection if the mobile station has indicated a follow-on request pending in ATTACH REQUEST. The network may also prolong the RR 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.

After that in UMTS, if the mobile station has indicated follow-on request pending 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.

*** Next Modification ***

4.7.5 Routing area updating procedure

4.7.5.1 Normal and periodic routing area updating procedure

4.7.5.1.1 Normal and periodic routing area updating procedure initiation

4.7.5.1.2 GMM Common procedure initiation

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.

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 section 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 RR connection if the mobile station has indicated a follow-on request pending in ROUTING AREA UPDATE REQUEST. The network may also prolong the RR connection without any indication from the mobile terminal.

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.

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.

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 04.65 [78] and TS 25.322).

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

NOTE: 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.

After that in UMTS, if the mobile station has indicated follow-on request pending and has a CM application request pending, it shall send an appropriate message (for example ACTIVATE PDP CONTEXT REQUEST) to the network.

*** Next Modification ***

9.4   GPRS Mobility Management Messages

9.4.2   Attach accept

This message is sent by the network to the MS to indicate that the corresponding attach request has been accepted. See table 9.4.2/TS 24.008.

Message type: ATTACH ACCEPT

Significance: dual

Direction: network to MS

Table 9.4.2/TS 24.008: ATTACH ACCEPT message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip indicator	Skip indicator 10.3.1	M	V	1/2
	Attach accept message identity	Message type 10.4	M	V	1
	Attach result	Attach result 10.5.5.1	M	V	1/2
	Force to standby	Force to standby 10.5.5.7	M	V	1/2
	Periodic RA update timer	GPRS Timer 10.5.7.3	M	V	1
	Radio priority for SMS	Radio priority 10.5.7.2	M	V	1/2
	Spare half octet	Spare half octet 10.5.1.8	M	V	1/2
	Routing area identification	Routing area identification 10.5.5.15	M	V	6
19	P-TMSI signature	P-TMSI signature 10.5.5.8	O	TV	4
17	Negotiated READY timer value	GPRS Timer 10.5.7.3	O	TV	2
18	Allocated P-TMSI	Mobile identity 10.5.1.4	O	TLV	7
23	MS identity	Mobile identity 10.5.1.4	O	TLV	6 - 7
25	GMM cause	GMM cause 10.5.5.14	O	TV	2
2A	T3302 value	GPRS Timer 10.5.7.3	O	TLV	3
8C	Cell Notification	Cell Notification 10.5.5.21	O	T	1

9.4.2.1   P-TMSI signature

This IE may be included to assign an identity to the MS's GMM context.

9.4.2.2   Negotiated READY timer

This IE may be included to indicate a value for the READY timer.

9.4.2.3   Allocated P-TMSI

This IE may be included to assign a P-TMSI to an MS in case of a GPRS or combined GPRS attach.

9.4.2.4   MS identity

This IE may be included to assign or unassign a TMSI to an MS in case of a combined GPRS attach.

9.4.2.5   GMM cause

This IE shall be included when IMSI attach for non-GPRS services was not successful during a combined GPRS attach procedure.

9.4.2.6   T3302 value

This IE may be included to indicate a value for the T3302 timer.

9.4.2.7   Cell Notification (GSM only)

In GSM, this IE shall be included by the SGSN in order to indicate the ability to support the Cell Notification.

9.4.15   Routing area update accept

This message is sent by the network to the MS to provide the MS with GPRS mobility management related data in response to a *routing area update request* message . See table 9.4.15/TS 24.008.

Message type: ROUTING AREA UPDATE ACCEPT

Significance: dual

Direction: network to MS

Table 9.4.15/TS 24.008: ROUTING AREA UPDATE ACCEPT message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip indicator	Skip indicator 10.3.1	M	V	1/2
	Routing area update accept message identity	Message type 10.4	M	V	1
	Force to standby	Force to standby 10.5.5.7	M	V	1/2
	Update result	Update result 10.5.5.17	M	V	1/2
	Periodic RA update timer	GPRS Timer 10.5.7.3	M	V	1
	Routing area identification	Routing area identification 10.5.5.15	M	V	6
19	P-TMSI signature	P-TMSI signature 10.5.5.8	O	TV	4
18	Allocated P-TMSI	Mobile identity 10.5.1.4	O	TLV	7
23	MS identity	Mobile identity 10.5.1.4	O	TLV	7
26	List of Receive N-PDU Numbers	Receive N-PDU Number list 10.5.5.11	O	TLV	4 - 19
17	Negotiated READY timer value	GPRS Timer 10.5.7.3	O	TV	2
25	GMM cause	GMM cause 10.5.5.14	O	TV	2
2A	T3302 value	GPRS Timer 10.5.7.3	O	TLV	3
8C	Cell Notification	Cell Notification 10.5.5.21	O	T	1

9.4.15.1   P-TMSI signature

This IE may be included to assign an identity to the MS's GMM context.

9.4.15.2   Allocated P-TMSI

This IE may be included to assign a P-TMSI to an MS in case of a GPRS or combined routing area updating procedure.

9.4.15.3   MS identity

This IE may be included to assign or unassign a TMSI to a MS in case of a combined routing area updating procedure.

9.4.15.4 List of Receive N-PDU Numbers

This IE shall be included in case of an inter SGSN routing area updating, if there are PDP contexts that have been activated in acknowledged transfer mode.

9.4.15.5 Negotiated READY timer value

This IE may be included to indicate a value for the READY timer.

9.4.15.6 GMM cause

This IE shall be included if IMSI attach was not successful for non-GPRS services during a combined GPRS routing area updating procedure.

9.4.15.7 T3302 value

This IE may be included to indicate a value for the T3302 timer.

9.4.15.8 Cell Notification (GSM only)

In GSM, this IE shall be included if by the SGSN in order to indicate the ability to support the Cell Notification.

*** Next Modification ***

10.5.5.21 Cell Notification

The purpose of the Ceell Notification information element is to indicate that the Cell Notification is supported by the network and shall be then used by MS.

The Ceell Notification information element is coded as shown in figure 10.5.136/GSM 24.008.
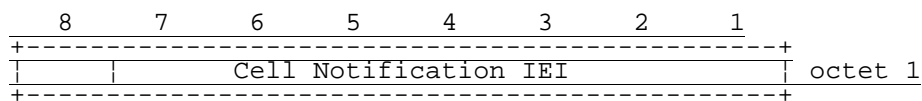
The Ceell Notification is a type 2 information element.

```
    8      7      6      5      4      3      2      1
 +-------------------------------------------------+
 |      |      |     Cell Notification IEI         | octet 1
 +-------------------------------------------------+
```

Figure 10.5.136/GSM 24.008: Cell Notification information element

No further changes.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

04.64	CR	**A142r2**		Current Version:	8.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	CN #8	for approval	X	Strategic	*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic	*use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network **X**
(at least one should be marked with an X)

Source:	Siemens / Ericsson	**Date:**	2000-05-18

Subject:	Change of the Cell update procedure

Work item:	GPRS

Category:	F	Correction	**X**	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	**X**
					Release 00	

Reason for change:	The MS/SGSN shall restart the GMM READY timer at transmission/reception of any LLC frame, including an LLC frame without an information field transmitted in order to perform cell update.
	If the user is travelling around in an urban area, where the cell size is small, the READY timer will be restarted, even if there is no active user-data transmission. Thus, the MS and SGSN will remain in GMM ready state for considerably longer than is necessary, and the MS will continue to perform cell updates.
	Frequent cell updates will lead to:
	- increase of network load;
	- waste of radio resources;
	- significant increase of MS battery consumption, due to increased signalling and time spent in non-DRX mode.
	In order to overcome this problem, it is proposed to introduce an optional cell update procedure where the READY timer will not be started if the LLC frame transmitted (by the MS)/received (by the SGSN) contains a cell update.
	This proposed change is optional for both the network and the MS.

Clauses affected:	6.4, 6.4.1.7 (new), 7.1.2, 7.2.1.3, 8.1

Other specs affected:	Other 3G core specifications	☐	→ List of CRs:
	Other GSM core specifications	**X**	→ List of CRs:
	MS test specifications	☐	→ List of CRs:
	BSS test specifications	☐	→ List of CRs:
	O&M specifications	☐	→ List of CRs:

Other	The proposed solution introduces a "Cell Notification" (which is in fact an optimised Cell

Update Procedure) into MS and SGSN. The possibility to use the Cell Notification will be indicated by the network and shall be used by the MS when the MS does support it. The update will be triggered by the LLC NULL frame (introduced in 04.64) which is only allowed to be send by the MS if the network indicates the Cell Notification.

The feature is mandatory for R99 but a R99 network must be able to handle pre R99 MS which do not support Cell Notification.

Indication of the Cell Notification

A new, optional information element (optional on syntax level but on semantic level mandatory for R99) is introduced into the ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT message to indicate the ability of the network to support the Cell Notification.

If both the MS and SGSN support the Cell Notification, and the ATTACH ACCEPT message or ROUTING AREA UPDATE ACCEPT message contains a new value of the READY timer, the MS shall send any LLC frame except the LLC NULL frame in order to start the READY timer (LLC NULL frame can not be sent because it does not trigger the start of the READY timer).

Behaviour at Cell Notification (new cell is entered)

A LLC NULL frame is introduced at the LLC layer. If both the MS and SGSN support the Cell Notification, an MS shall transmit the LLC NULL frame in order to indicate a cell change to the network. The MS shall not start the READY timer as a result of transmitting the LLC NULL frame. Similarly, the SGSN shall not start the READY timer as a result of receiving LLC NULL frame.

Further:

An MS shall not transmit LLC NULL frame as a response to paging for PS services. If the MS does not support the Cell Notification but the SGSN indicates the ability to support them then the behaviour at cell update remains as currently specified.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.4 Commands and responses

The following commands and responses are used by the MS and the SGSN LLEs and are represented in Table 4. Each logical link connection shall support the appropriate set of commands and responses for the type of operation desired (see clause 8).

Those frame types not identified in Figure 8, Fugure 9, or Table 4, shall be identified as having undefined command and/or response control fields, and shall be treated as defined in subclause 8.8.2.

Table 14: Commands and responses

Format	Commands	Responses	Encoding					
			S1	S2	M4	M3	M2	M1
Information + Supervisory	RR	RR	0	0	-	-	-	-
	ACK	ACK	0	1	-	-	-	-
	RNR	RNR	1	0	-	-	-	-
	SACK	SACK	1	1	-	-	-	-
Unnumbered	-	DM	-	-	0	0	0	1
	DISC	-	-	-	0	1	0	0
	-	UA	-	-	0	1	1	0
	SABM	-	-	-	0	1	1	1
	-	FRMR	-	-	1	0	0	0
	XID	XID	-	-	1	0	1	1
	NULL	-	-	-	0	0	0	0

Note: The NULL frame is only allowed if the Cell Notification is used (24.008)

The commands and responses in Table 4 are defined in the following subclauses.

Next Section to Modify   (new Section)

6.4.1.7   NULL command

The NULL unnumbered command shall be used by an LLE of the MS to indicate a cell update. The NULL unnumbered command is only allowed if the Cell Notification is indicated by the network (see 23.060 and 24.008).

No information field is permitted with the NULL command.