

**Source:** TSG CN WG 1  
**Title:** CR to Rel-6 on Work Item TEI6 towards 24.008  
**Agenda item:** 9.10  
**Document for:** APPROVAL

---

**Introduction:**

This document contains 1 CR, **Rel-5 to Work Item "TEI6"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #19 for approval.

Spec	CR	Rev	Cat	Phase	Subject	Version-Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.008	733	1	C	Rel-6	Interruption of DL user data transmission during P-TMSI reallocation	5.6.0	6.0.0	N1-28	N1-030224

## CHANGE REQUEST

⌘ **24.008 CR 733** ⌘ rev **1** ⌘ Current version: **5.6.0** ⌘

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

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

<b>Title:</b>	⌘ Interruption of DL user data transmission during P-TMSI reallocation		
<b>Source:</b>	⌘ Siemens AG		
<b>Work item code:</b>	⌘ TEI6	<b>Date:</b>	⌘ 31.01.2003
<b>Category:</b>	⌘ <b>C</b> Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .	<b>Release:</b>	⌘ Rel-6 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

**Reason for change:** ⌘ According to the current version of 24.008, in GSM the network shall not send any user data during a routing area update with P-TMSI reallocation or during a stand-alone P-TMSI reallocation. The latter restriction also applies to UMTS.

The restriction for GSM goes back to a time, when the switch-over from the TLLI derived from the old P-TMSI to the TLLI derived from the new P-TMSI was not described in sufficient detail in the standard. Meanwhile, such a description has been provided in subclauses 4.7.1.4 and 4.7.1.5, and a seamless switch-over is possible. If an inter-SGSN routing area update takes place, the network may need to suspend the transmission of userdata for other reasons, e.g. in order to perform an XID negotiation, but this is not necessarily related to the allocation of a new P-TMSI.

For the restriction for UMTS there is no technical reason. Apparently it was just inherited from GSM in R99.

No impact on the MS implementations is expected, since for the routing area update procedure, subclause 4.7.5 already specifies that:

In GSM, user data transmission in the MS shall be suspended during the routing area updating procedure; **user data reception shall be possible.**

...

In UMTS, user data transmission and **reception in the MS shall not be suspended** during the routing area updating procedure. User data transmission in the network shall not be suspended during the routing area updating procedure.

and, for the MS, the stand-alone P-TMSI reallocation only takes the negligible short interval from the receipt of P-TMSI REALLOCATION COMMAND until transmission of P-TMSI REALLOCATION COMPLETE.

<b>Summary of change:</b>	⌘	The suspension of user data transmission during a routing area update or stand-alone P-TMSI reallocation is made optional for the network.									
<b>Consequences if not approved:</b>	⌘	Unnecessary interruption of the downlink data traffic during a routing area update with P-TMSI reallocation or during a stand-alone P-TMSI reallocation.									
<b>Clauses affected:</b>	⌘	4.7.5, 4.7.6.1									
<b>Other specs affected:</b>	⌘	<table border="1"> <thead> <tr> <th>Y</th> <th>N</th> </tr> </thead> <tbody> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> </tbody> </table>	Y	N		X		X		X	Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘
Y	N										
	X										
	X										
	X										
<b>Other comments:</b>	⌘										

**How to create CRs using this form:**

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

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 4.7.5 Routing area updating procedure

This procedure is used for:

- normal routing area updating to update the registration of the actual routing area of an MS in the network. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services if the network operates in network operation mode II or III;
- combined routing area updating to update the registration of the actual routing and location area of an MS in the network. This procedure is used by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services provided that the network operates in network operation mode I;
- periodic routing area updating. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS or for GPRS and non-GPRS services independent of the network operation mode;
- IMSI attach for non-GPRS services when the MS is IMSI attached for GPRS services. This procedure is used by GPRS MSs in MS operation modes A or B, if the network operates in network operation mode I;
  - in GSM, resuming GPRS services when the RR sublayer indicated a resumption failure after dedicated mode was left, see 3GPP TS 44.018 [84];
  - in GSM, updating the network with the new MS Radio Access Capability IE when the content of the IE has changed. Normal or combined routing area updating procedure is used.;
  - updating the network with the new DRX parameter IE when the content of the IE has changed. Normal or combined routing area updating procedure is used.;
- UMTS to GSM and for GSM to UMTS intersystem change, see subclause 4.7.1.7; or
- in UMTS, to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

The routing area updating procedure shall also be used by a MS which is attached for GPRS services if a new PLMN is entered (see 3GPP TS 23.122 [14]).

Subclause 4.7.5.1 describes the routing area updating procedures for updating the routing area only. The combined routing area updating procedure used to update both the routing and location area is described in subclause 4.7.5.2.

The routing area updating procedure is always initiated by the MS. It is only invoked in state GMM-REGISTERED.

To limit the number of subsequently rejected routing area update attempts, a routing area updating attempt counter is introduced. The routing area updating attempt counter shall be incremented as specified in subclause 4.7.5.1.5. Depending on the value of the routing area updating attempt counter, specific actions shall be performed. The routing area updating attempt counter shall be reset when:

- a GPRS attach procedure is successfully completed; or
- a routing area updating procedure is successfully completed;

and additionally when the MS is in substate ATTEMPTING-TO-UPDATE:

- a new routing area is entered;
- expiry of timer T3302; or
- at request from registration function.

The mobile equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". The handling of these lists is described in subclause 4.4.1.

The Mobile Equipment shall contain a list of "equivalent PLMNs". The handling of this list is described in subclause 4.4.1.

In GSM, user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible. User data transmission in the network ~~may~~ shall be suspended during the routing area updating procedure, if a new P-TMSI is assigned.

In UMTS, user data transmission and reception in the MS shall not be suspended during the routing area updating procedure. User data transmission in the network shall not be suspended during the routing area updating procedure.

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

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

The network informs the MS about the support of specific features, such as LCS-MOLR, in the "Network feature support" Information Element. The information is either explicitly given by sending the "Network feature support" IE or implicitly by not sending it. The handling in the network is described in subclause 9.4.15.11. The MS may use the indication to inform the user about the availability of the appropriate services and it shall not request services that have not been indicated as available.

\*\*\*\*\* NEXT MODIFIED SECTION \*\*\*\*\*

## 4.7.6 P-TMSI reallocation procedure

A temporary mobile station identity for GPRS services, the Packet-TMSI (P-TMSI), is used for identification within the radio interface signalling procedures. The structure of the P-TMSI is specified in 3GPP TS 23.003 [10]. The P-TMSI has significance only within a routing area. Outside the routing area it has to be combined with the routing area identification (RAI) to provide for an unambiguous identity.

The purpose of the P-TMSI reallocation procedure is to provide identity confidentiality, i.e. to protect a user against being identified and located by an intruder (see 3GPP TS 42.009 [5] and 43.020 [13]).

Usually, P-TMSI reallocation is performed at least at each change of a routing area. (Such choices are left to the network operator).

The reallocation of a P-TMSI is performed by the unique procedure defined in this subclause. This procedure can only be initiated by the network in state GMM-REGISTERED.

P-TMSI can also be implicitly reallocated in the attach or routing area updating procedures. The implicit reallocation of a P-TMSI is described in the corresponding subclause s.

NOTE: Normally, the P-TMSI reallocation will take place in conjunction with another GMM procedure, e.g. at routing area updating (see 3GPP TS 29.002 [37]).

### 4.7.6.1 P-TMSI reallocation initiation by the network

The network initiates the P-TMSI reallocation procedure by sending a P-TMSI REALLOCATION COMMAND message to the MS and starts the timer T3350.

The P-TMSI REALLOCATION COMMAND message contains a new combination of P-TMSI, RAI and optionally a P-TMSI signature allocated by the network.

The network ~~may suspend~~ shall not send any the transmission of user data during the P-TMSI reallocation procedure.

### 4.7.6.2 P-TMSI reallocation completion by the MS

Upon receipt of the P-TMSI REALLOCATION COMMAND message, the MS stores the Routing Area Identifier (RAI) and the P-TMSI and sends a P-TMSI REALLOCATION COMPLETE message to the network.

If a P-TMSI signature is present in the P-TMSI REALLOCATION COMMAND message, the MS shall store the new P-TMSI signature and shall if available delete the old P-TMSI signature. If no P-TMSI signature is present in the P-TMSI REALLOCATION COMMAND message, the old P-TMSI signature, if available, shall be kept.

### 4.7.6.3 P-TMSI reallocation completion by the network

Upon receipt of the P-TMSI REALLOCATION COMPLETE message, the network stops the timer T3350 and considers both the old and the new P-TMSI and the corresponding P-TMSI signatures as valid until the old P-TMSI can be considered as invalid by the network (see subclause 4.7.1.5).

In GSM, the GMM layer shall notify the LLC layer that the P-TMSI has been changed (see 3GPP TS 44.064 [78a]).

\*\*\*\*\* THIS SECTION IS PROVIDED FOR INFORMATION ONLY \*\*\*\*\*

### 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 3GPP TS 25.301[10].

#### 4.7.1.4.1 Radio resource sublayer address handling (GSM only)

This subclause 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 3GPP 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; 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.

After a successful GPRS attach or routing area update procedure, independent whether a new P-TMSI is assigned, if the MS has stored a valid P-TMSI then the MS shall derive a local TLLI from the stored P-TMSI and shall use it for addressing at lower layers.

NOTE: Although the MS derives a local TLLI for addressing at lower layers, the network should not assume that it will receive only LLC frames using a local TLLI. Immediately after the successful GPRS attach or routing area update procedure, the network must be prepared to continue accepting LLC frames from the MS still using the foreign TLLI.

##### 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 shall assign a P-TMSI to the MS. The network 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.

NOTE: Although the MS derives a local TLLI for addressing at lower layers, the network should not assume that it will receive only LLC frames using a local TLLI. Immediately after the successful GPRS attach, the network must be prepared to continue accepting LLC frames from the MS still using the random TLLI.

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.

#### 4.7.1.5 P-TMSI handling

##### 4.7.1.5.1 P-TMSI handling in GSM

If a new P-TMSI is assigned by the network the MS and the network shall handle the old and the new P-TMSI as follows:

Upon receipt of a GMM message containing a new P-TMSI the MS shall consider the new P-TMSI and new RAI and also the old P-TMSI and old RAI as valid in order to react to paging requests and downlink transmission of LLC frames. For uplink transmission of LLC frames the new P-TMSI shall be used.

The MS shall consider the old P-TMSI and old RAI as invalid as soon as an LLC frame is received with the local TLLI derived from the new P-TMSI.

Upon the transmission of a GMM message containing a new P-TMSI the network shall consider the new P-TMSI and new RAI and also the old P-TMSI and old RAI as valid in order to be able to receive LLC frames from the MS.

The network shall consider the old P-TMSI and old RAI as invalid as soon as an LLC frame is received with the local TLLI derived from the new P-TMSI.

##### 4.7.1.5.2 P-TMSI handling in UMTS

If a new P-TMSI is assigned by the network the MS and the network shall handle the old and the new P-TMSI as follows:

Upon receipt of a GMM message containing a new P-TMSI the MS shall consider the new P-TMSI and new RAI as valid. Old P-TMSI and old RAI are regarded as invalid.

The network shall consider the old P-TMSI and old RAI as invalid as soon as an acknowledge message (e.g. ATTACH COMPLETE, ROUTING AREA UPDATE COMPLETE and P-TMSI REALLOCATION COMPLETE) is received.