3GPP TSG CN Plenary Meeting #16 **NP-020224**
5th - 7th June 2002. Marco Island, USA.

Source: **TSG CN WG 1**

Title: **CRs to Rel-4 (with one mirror CR) on Work Item TEI4 towards various TSs**

Agenda item: **7.12**

Document for: **APPROVAL**

Introduction:

This document contains **8** CRs on **Rel-4 including one mirror CR on** Work Item **"TEI4"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.007	053	1	Rel-4	Various clean-up of wrong references, eg towards 44.018 and 23.271	F	4.1.0	4.2.0	N1-24	N1-021367
29.016	006		Rel-4	Various clean-up of wrong references	F	4.0.0	4.1.0	N1-24	N1-021326
29.018	030		Rel-4	Various clean-up of wrong references, as eg 24.008 instead of 44.018	F	4.3.0	4.4.0	N1-23	N1-020854
29.018	031		Rel-5	Various clean-up of wrong references, as eg 24.008 instead of 44.018	A	5.1.0	5.2.0	N1-23	N1-020855
44.001	001		Rel-4	Various clean-up of wrong references	F	4.0.0	4.1.0	N1-24	N1-021191
44.013	001		Rel-4	Various clean-up of wrong references, eg towards 44.018	F	4.0.0	4.1.0	N1-24	N1-021344
44.068	003	1	Rel-4	Various clean-up of wrong references, eg towards 44.018	F	4.2.0	4.3.0	N1-24	N1-021368
44.069	003	1	Rel-4	Various clean-up of wrong references, eg towards 44.018	F	4.2.0	4.3.0	N1-24	N1-021369

3GPP TSG-CN1 Meeting #24

Tdoc N1-021367
Revision of Tdoc N1-021193

Budapest, Hungary, 13. – 17. May 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.007** **CR** **053** ⌘ **rev** **1** ⌘ Current version: **4.1.0** ⌘

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

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Various clean-up of wrong references, eg towards 44.018 and 23.271
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4
Date:	⌘	01.05.2002
Category:	⌘	**F**
Release:	⌘	Rel-4

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

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

Reason for change:	⌘	To list and make correct reference to 44.018, 23.271 and many other specifications.
Summary of change:	⌘	01.02 and 03.56 was never taken to UMTS. They are not refered to in the body but kept with the last release specified. Also 44.068 and 23.110 needed to be added in reference list since they were refered to in the text. 03.71 was replaced by 23.271 from Rel-4 onwards. (25.305 superceded 23.071 from R99 onwards,- not referenced) 04.08 split to 44.018 is missing.
Consequences if not approved:	⌘	Wrong and insufficient references made.

Clauses affected:	⌘	2, 3, 4.3.2, 4.3.4, 6.5.2, 6.6, 6.7, 6.8, 7.3, 7.4, 7.5.2, 7.6, 8, 9.3, 9.3.1, 9.4, 10.3.1, 11.2.3.1.1, 11.2.3.2.3
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

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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.

2 References

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

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

[1] ~~3GPP TS~~GSM 01.02(R97): "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

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

[2] 3GPP TS ~~03.01~~23.101: "General UMTS Architecture~~Digital cellular telecommunications system (Phase 2+); Network functions~~".

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

[3b] ~~3GPP TS~~GSM 03.56(R98): "Digital cellular telecommunications system (Phase 2+); GSM Cordless Telephony System (CTS), Phase 1; CTS Architecture Description; Stage 2".

[3] 3GPP TS ~~04.01~~44.001: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; General aspects and principles".

[3b] 3GPP TS ~~03.71~~23.271: "Functional stage 2 description of location services~~Digital cellular telecommunications system (Phase 2+); Location Services (LCS) Functional Description; Stage 2~~".

[4] 3GPP TS ~~04.05~~44.005: "~~Digital cellular telecommunications system (Phase 2+);~~ Data Link (DL) layer; General aspects".

[5] 3GPP TS ~~04.06~~44.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[5a] 3GPP TS ~~04.14~~44.014: "~~Digital cellular telecommunications system (Phase 2+);~~ Individual equipment type requirements and interworking; Special conformance testing functions".

[6] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification Core Network Protocols-Stage 3".

[6a] 3GPP TS 23.108: "Mobile radio interface Layer 3 specification Core Network Protocols Stage 2 (structured procedures)".

[6b] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[7] 3GPP TS 24.010: "Mobile radio interface Layer 3; Supplementary services specification; General aspects".

[8a] 3GPP TS ~~04.71~~44.071: "~~Digital cellular telecommunications system (Phase 2+);~~ Location Services (LCS); Mobile radio interface layer 3 LCS specification".

[8] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[9] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary services specification; Formats and coding".

[10] 3GPP TS 24.081: "Line identification supplementary services; Stage 3".

[10a] 3GPP TS ~~04.60~~44.060: "~~ Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Services (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC~~S~~/MAC) protocol".

[10b] 3GPP TS ~~04.56~~44.056: "~~ Digital cellular telecommunications system (Phase 2+);~~ GSM Cordless Telephony System (CTS), phase 1; CTS radio interface Layer 3 specification".

[11] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services - Stage 3".

[11a] 3GPP TS ~~04.64~~44.064: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[12] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".

[12a] 3GPP TS ~~04.65~~44.065: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[13] 3GPP TS 24.084: "MultiParty (MPTY) supplementary services; Stage 3".

[14] 3GPP TS 24.085: "Closed User Group (CUG) supplementary services; Stage 3".

[15] 3GPP TS 24.086: "Advice of Charge (AoC) supplementary services; Stage 3".

[16] 3GPP TS 24.088: "Call Barring (CB) supplementary services; Stage 3".

[17] 3GPP TS 24.090: "Unstructured Supplementary Service Data (USSD) - Stage 3".

[17a] 3GPP TS 34.109: "Terminal logical test interface; Special conformance testing functions".

[18] ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic Reference Model: The basic model".

[19] 3GPP TS 44.068: "Group Call Control (GCC) Protocol".

~~[20] GSM 04.63 (R98): " Digital cellular telecommunications system (Phase 2+); Packet Data on Signalling channels Service (PDS) Service Description, Stage 3".~~

[~~21~~20] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".

3 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR ~~01.04~~21.905 [1a] and the following apply:

GMM	GPRS Mobility Management
MNS	Mobile Network Signalling
N-PDU	Network-Protocol Data Unit
SM	Session Management
UDT	User Data Transfer
CTS	Cordless Telephony System
LCS	LoCation Services

4.3.2 Abstract service primitives

The abstract service primitives consist of requests, responses, indications and confirmations. The general syntax of a primitive is specified in 3GPP TR 21.905 [1a].

4.3.3 Protocols and peer-to-peer communication

By use of the services provided by lower (sub-)layers, peer entities in a (sub-)layer in the MS and the network exchange information. Exchange of information between two peer entities is performed according to the corresponding (sub-)layer protocols. A protocol is a set of rules and formats by which the information (control information and user data) is exchanged between the two peers. The information is exchanged by use of messages which are defined in the protocol. (Therefore, the messages are also called Protocol Data Units, PDUs).

There are several protocols of the RR sublayer, one protocol of the LLC sublayer, three protocols of the MM sublayer, and several protocols of the CM sublayer. For each functional block of the CM sublayer as defined in subclause 4.1 there is one protocol. The CM protocols are specified in the Technical Specifications identified in subclause 4.3.4.

In the model used in the present document, there are:

1) for non-GPRS services:

- one RR sub-layer entity in the MS and one RR sub-layer entity in the network;
- one MM sub-layer entity in the MS and one MM sub-layer entity in the network;
- for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the network), there are, depending on the protocol, one or more entities in the MS (in the network). Two different entities of the same functional block in the MS (in the network) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the network. The corresponding entities are called peer entities;

2) for CTS services (in addition to non-GPRS services):

- one RR sub-layer entity in the MS and one in the CTS fixed part. These RR sub-layers include one CTS-RR sub-entity on each side;
- one MM sub-layer entity in the MS and one in the CTS fixed part These MM sub-layers include one CTS-MM sub-entity on each side;
- for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the fixed part), there are, depending on the protocol, one or more entities in the MS (in the fixed part). Two different entities of the same functional block in the MS (in the fixed part) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the fixed part. The corresponding entities are called peer entities;

3) for GPRS services supporting Class C MSs:

- one RR sublayer entity (RR) in the MS and one RR sublayer entity in the network;
- six LLC sublayer entities (QoS1-QoS4, signalling, SMS) in the MS and six LLC sublayer entities in the network;
- one MM sublayer entity (GMM) in the MS and one MM sublayer entity in the network (GMM);
- one SM entity in the MS's CM sublayer and one SM sublayer entity in the network's CM sublayer;
- one or more GSMS functional blocks in the CM sublayer if supported;

4) for non-GPRS and GPRS services supporting Class A and Class B MSs:

- two RR sublayer entities (RR) in the MS and two RR sublayer entities in the network;
- six LLC sublayer entities (QoS1-QoS4, signalling, SMS) in the MS and six LLC sublayer entities in the network;
- two MM sublayer entities (GMM + MM) in the MS and one or two MM sublayer entities in the network (GMM or MM);
- one SM entity in the MS's CM sublayer and one SM entity in the network's CM sublayer;

- for each functional block of the CM sublayer as defined in subclause 4.1 which is supported in the MS (in the network), there are, depending on the protocol, one or more entities in the MS (in the network). Two different entities of the same functional block in the MS (in the network) are called parallel entities. The entities of the same functional block in the MS correspond in a one-to-one relation to the entities of the functional block in the network. The corresponding entities are called peer entities.

As each sub-layer entity is specified by one and only one protocol, it is also called a protocol entity or protocol control entity.

For GPRS-services supporting Class A and Class B MSs, the MM entities of the MM-sublayer are able to exchange information by means of GMM PDUs as well as MM PDU's. This means if a mobile is GPRS attached, non-GPRS mobility management procedures may make use of GRPS mobility management messages.

When two peer protocol entities exchange PDUs, a transaction is said to be established (or: to be active; or: to exist). It depends from the protocol when exactly a protocol entity considers the transaction to be active, normally this is the case:

- from the moment when it has passed the first suitable message to lower (sub-) layers or received the first suitable message from its peer entity;
- up to the moment when it has released the transaction.

4.3.4 Contents of layer 3 related Technical Specifications

- The Radio Resource (RR) management protocol is defined in ~~GSM~~3GPP TS ~~04.08~~44.018 [6b];
- the Mobility Management (MM) protocol is defined in 3GPP TS 24.008 [6];
- the Session Management (SM) protocol is defined in 3GPP TS 24.008 [6];
- the Call Control (CC) protocol is defined in 3GPP TS 24.008 [6];
- the Supplementary Services (SS) protocol is defined in 3GPP TS 24.010 [7], 3GPP TS 24.08x and 3GPP TS -24.09x;
- the Short Message Service (SMS) protocol is defined in 3GPP TS 24.011 [8~~7~~];
- the Group Call Control (GCC) protocol is defined in ~~GSM~~ 3GPP TS ~~04.68~~44.068 [19];
- ~~the protocol for Packet Data on Signalling channels (PDS), PDSS1 is defined in GSM 04.63 [20];~~
- the Logical Link Control (LLC) protocol is defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a];
- the GPRS Radio Resource (GRR) protocol is defined in ~~GSM~~ 3GPP TS ~~04.60~~44.060 [10a] and 3GPP TS 24.008 [6];
- the CTS Radio Resource (CTS-RR) sub-protocol is defined in ~~GSM~~ 3GPP TS ~~04.56~~44.056 [10b];
- the CTS Mobility Management (CTS-MM) sub-protocol is defined in ~~GSM~~ 3GPP TS ~~04.56~~44.056 [10b];
- the CTS additions to the Call Control (CC) protocol are defined in ~~GSM~~ 3GPP TS ~~04.56~~44.056 [10b];
- the Location Services (LCS) protocol is defined in ~~GSM~~ 3GPP TS ~~03.71~~23.271 [3b] and ~~GSM~~ 3GPP TS ~~04.71~~44.071 [8a].

6.5.2 Session Management Services for SNSM-SAP (GSM only)

The SNSM-SAP service primitives are defined in ~~GSM~~ 3GPP TS ~~04.65~~44.065 [12a].

6.6 Registration Services for GPRS-Services

The attach/detach procedures comprise the registration services which are provided at the GMMREG-SAP.

It shall be noted, that the registration services for mobiles of class A or B may depend on the service states for GPRS and non-GPRS services. Therefore the internal access points MMCOORD and the GMMCOORD (see figure 5.3) are used by GMM and MM to inform each other about the relevant conditions. No service primitives between the entities within the same sublayer, i.e. the MM sublayer, are defined in ~~04.07~~the present document. The Mobility Management for class A and B mobiles is further specified in 3GPP TS ~~04.08~~24.008 [6].

6.7 Services provided to SNDCP entities by GPRS Logical Link Control services

This clause is informative, the service primitives are defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a]. They are included here to provide a complete overview of the radio interface protocol architecture.

Logical Link Control services are provided at the QoS1-SAP - QoS4 SAP towards the SNDCP and at the LLSMS-SAP towards SMS.

6.8 Location services at the MS side

The location services (initiation of positioning measurements at the MS are provided at the service access point MNLCS-SAP. The service provided by the CM sublayer to support the location services is defined in 3GPP TS ~~04.71~~44.071 [8a].

7.3 Short Message Services Support

The service provided by the CM sublayer to support the short message service are defined in 3GPP TS 24.011[8].

7.4 Services provided to SNDCP and SMS entities by GPRS Logical Link Control services

This clause is informative, the service primitives are defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a]. They are included here to provide a complete overview of the radio interface protocol architecture.

On the network side, Logical Link Control services are provided at the QoS1-SAP - QoS4 SAP towards the SNDCP and at the LLSMS-SAP towards SMS.

7.5.2 Session Management Services for SNSM-SAP

The SNSM-SAP service primitives are defined in ~~GSM~~ 3GPP TS ~~04.65~~44.065 [12a].

7.6 Location services at the Network side

The location services (initiation of location measurements at the network) are provided at the service access point MNLCS-SAP. The service provided by the CM sublayer to support the location services is defined in ~~GSM~~ 3GPP TS ~~04.71~~44.071 [8a].

8 Services assumed from signalling layers 1 and 2

The services provided by layer 2 are defined in detail in 3GPP TS ~~04.05~~44.005 [4]. A short summary is given below.

In addition, layer 1 communicates directly with layer 3 for information transfer related to channel management and to measurement control. See clause 8.5 below.

9.3 Services provided by radio resource management entity for GPRS services

The service primitives for UMTS are defined in the present document. The services provided by the Access Stratum (AS) are specified in 3GPP TS 23.110 [~~21~~20].

9.3.1 Service primitives for GRR-SAP (GSM only)

The GRR-SAP service primitives are defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a]

[[Table 9.3.1, and chapters 9.3.1.1 - 9.3.1.5 are Void]

9.4 Services provided by the LLC entity for GPRS services (GSM only)

This subclause is informative, the service primitives are defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a]. They are included here to provide a complete overview of the radio interface protocol architecture.

10.3.1 Service primitives for GRR-SAP

The GRR-SAP service primitives are defined in ~~GSM~~ 3GPP TS ~~04.64~~44.064 [11a]

[Table 10.3.1, and chapters 10.3.1.1 - 10.3.1.5 are Void]

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	Reserved: was allocated in earlier phases of the protocol~~PDSS1~~
0 0 1 1	call control; call related SS messages
0 1 0 0	GPRS Transparent Transport Protocol (GTTP)
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 [5a] ~~GSM~~ 3GPP TS ~~04.14~~44.014 and [17a] 3GPP TS 34.109.

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 3GPP TS ~~04.08~~44.018 [6b].

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.

11.2.3.2.3 Sequenced message transfer operation

Upper layer messages sent using the RR sub-layer transport service from the mobile station to the network can be duplicated by the data link layer in at least the following cases:

- in A/Gb mode, when a channel change of dedicated channels is required (assignment or handover procedure) and the last layer 2 frame has not been acknowledged by the peer data link layer before the mobile station leaves the old channel;

- in Iu mode, when an RLC re-establishment occurs (e.g. due to relocation) and the RLC layer has not acknowledged the last one or more RLC PDUs before RLC re-establishment;

- an inter-system change from Iu mode to A/Gb mode is performed and the RLC layer has not acknowledged the last one or more RLC PDUs;

- an inter-system change from A/Gb mode to Iu mode is performed and the the last layer 2 frame in A/Gb mode has not been acknowledged by the peer data link layer before the mobile station leaves the old channel.

In these cases, the mobile station does not know whether the network has received the messages correctly. Therefore, the mobile station has to send the messages again when the channel change is completed.

The network must be able to detect the duplicated received messages. Therefore, each concerned upper layer messages must be marked with a send sequence number.

To allow for different termination points in the infrastructure of the messages of different PDs, the sequence numbering is specific to each PD. For historical reasons, an exception is that messages sent with the CC, SS and MM PDs share the same sequence numbering. In the following, the phrase **upper layer message flow** refers to a flow of messages sharing the same sequence numbering. The different upper layer flows are MM+CC+SS, GCC, BCC and LCS. The GMM, SM, SMS and TC (Test Control, see 3GPP TS ~~04.14~~44.014 [5a] and 3GPP TS 34.109 [17a]) protocols do not use layer 3 sequence numbering.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021326

CR-Form-v5

CHANGE REQUEST

⌘ **29.016** **CR** **006** ⌘ **rev** **-** ⌘ Current version: **4.0.0** ⌘

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

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

Title:	⌘	Various clean-up of wrong references
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4 ***Date:*** ⌘ 07.05.2002
Category:	⌘	**F** ***Release:*** ⌘ Rel-4

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Wrong reference used, and several updates on references were missing.
Summary of change:	⌘	Some changes except for editorials and normal GSM to 3GPP conversions are listed as: TS 01.04 replaced by TR 21.905. 03.61 and 03.62 are withdrawn. 12.00, 12.01, 12.13, 12.14 and 12.20 existed only before R99 (phase 1 or 2).
Consequences if not approved:	⌘	Misleading text, and then the new creation of 29.016 Rel-5 will have bad base.

Clauses affected:	⌘	Most all subclauses		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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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.

3GPP TS 29.016 V4.0.0 (2001-03)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Core Network; General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service specification (Release 4)

Keywords
UMTS, GSM, GPRS, packet, VLR

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Foreword

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

~~This Technical Specification has been produced by the 3GPP.~~

Th~~is TS~~e present document provides a mechanism giving reliable transfer of signalling messages between the Serving GPRS Support Node (SGSN) and the data base of a Visitors Location Register (VLR) for co-ordination between GSM circuit switched services and GSM packet data services within the 3GPP system.

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

Version ~~3~~x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the specification;

Introduction

~~This~~ The present document specifies or references the necessary information to provide a reliable transfer of signalling messages between the Serving GPRS Support Node (SGSN) and the Visitors Location Register (VLR). This reliable transfer of messages is provided by the Network Service Part (NSP) of the Signalling System No 7 (SS7). This documents specifies or references the subset of MTP and SCCP to be used in the Gs interface.

1 Scope

~~This~~ The present document specifies or references the subset of MTP and SCCP which is used for the reliable transport of BSSAP+ messages in the Gs interface. The present~~is~~ document references the 3GPP TS 29.202 which specifies alternative transport layers that can be applied instead of the MTP. ~~This document~~The present document also specifies the SCCP addressing capabilities to be provided in the Gs interface.

This~~is Technical Specification~~e present document is divided into two main parts, ~~Chapter~~ clause 5 dealing with the use of MTP and ~~chapters~~ clauses 6 and ~~-~~7 dealing with the use of SCCP.

Clause 5 of this~~is Technical Specification~~e present document deals with the subset of the MTP that is required between an SGSN and a VLR. It is intended that this implementation of MTP is compatible with a full MTP implementation. ~~Chapter~~ Clause 4 references the 3GPP TS 29.202 which specifies alternatives to the MTP.

The SCCP is used to provide message routing between the SGSN and the VLR. The SCCP routing principles specified in ~~this Technical Specification~~the present document allow to connect one SGSN to several VLR. No segmentation at SCCP level is needed on the Gs interface. Only SCCP class 0 is used on the Gs interface. C~~c~~lauses 6 and ~~-~~7 identify the SCCP subset that should be used between an SGSN and an VLR.

2 References

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

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

2.1 Normative references

[1] ~~3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".~~Void.

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

[2] 3GPP TS ~~02.60~~22.060: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Service description; Stage 1".

[3] 3GPP TS ~~03.03~~23.003: "~~Digital cellular telecommunications system (Phase 2+);~~ Numbering, addressing and identification".

[4] 3GPP TS ~~03.22~~43.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Functions related to Mobile Station (MS) in idle mode and group receive mode".

[5] 3GPP TS ~~03.60~~23.060: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Service description; Stage 2".

[6] 3GPP TS ~~08.06~~48.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[7] 3GPP TS ~~08.08~~48.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile-services Switching Centre - Base Station System (MSC - BSS) interface~~:~~; Layer 3 specification".

[8] 3GPP TS ~~08.18~~48.018: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)~~Serving GPRS Support Node (SGSN) - Base Station System (BSS): BSS GPRS Protocol (BSSGP)~~".

[9] 3GPP TS ~~09.02~~29.002: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Application Part (MAP) specification".

[10] 3GPP TS ~~09.08~~49.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Application of the Base Station System Application Part (BSSAP) on the E-interface".

[11] 3GPP TS ~~09.18~~29.018~~29.018~~: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR);~~Mobile Switching Center (MSC):~~ Gs interface Layer 3 specification".

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

[13] ITU-T Recommendation Q.711: "Functional description of the signalling connection control part".

[14] ITU-T Recommendation Q.712: "Definition and function of signalling connection control part~~SCCP~~ messages".

[15] ITU-T Recommendation Q.713: "Signalling connection control part~~SCCP~~ formats and codes".

[16] ITU-T Recommendation Q.714: "Signalling connection control part procedures".

[17] ITU-T Recommendation Q.702: "~~Specification of Signalling System No.7~~ Signalling data link".

[18] ITU-T Recommendation Q.703: "Signalling link".

[19] ITU-T Recommendation Q.704: "Signalling network functions and messages".

[20] ITU-T Recommendation Q.707: "~~Specification of Signalling System No.7~~ Testing and maintenance".

[21] ANSI ~~Recommendation~~ T1.111 (1996):"Signalling System No. 7 (SS7); Message Transfer Part ~~(MTP)~~".

[22] ANSI ~~Recommendation~~ T1.112 (1996): "Signalling System No. 7 (SS7); Signalling Connection Control Part ~~(SCCP)~~ Functional Description".

[41] 3GPP TS 29.202: "Signalling System No. 7 (SS7) ~~S~~signalling ~~T~~transport in ~~C~~core ~~N~~network; Stage 3 ~~(Release 4)~~"

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2.2 Informative references

[23] ~~GSM~~3GPP TS ~~02.01~~22.001: "~~Digital cellular telecommunications system (Phase 2+);~~ Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[24] ~~GSM~~3GPP TS ~~02.02~~22.002: "~~Digital cellular telecommunications system (Phase 2+);~~Circuit Bearer Services (BS) supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[25] ~~GSM~~3GPP TS ~~02.03~~22.003: " ~~Digital cellular telecommunications system (Phase 2+);~~Circuit Teleservices supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[26] ~~GSM 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".~~Void.

[27] ~~GSM 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".~~Void.

[28] ~~GSM~~3GPP TS ~~03.64~~43.064: "~~Digital cellular telecommunications system (Phase 2+);~~ Overall description of the ~~General Packet Radio Service (~~GPRS~~)~~ Radio interface; Stage 2".

[29] ~~GSM~~3GPP TS ~~04.02~~24.002: "~~Digital cellular telecommunications system (Phase 2+);~~ GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[30] ~~GSM~~3GPP TS ~~04.07~~24.007: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface signalling layer 3; General aspects".

[31] ~~GSM~~3GPP TS ~~04.08~~24.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface layer -3 specification; Core network protocols; Stage 3".

[32] ~~GSM~~3GPP TS ~~04.65~~44.065: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[33] ~~GSM~~3GPP TS ~~08.60~~48.060: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."

[34] ~~GSM~~3GPP TS ~~09.60~~29.060: "~~Digital cellular telecommunications system (Phase 2+),~~ General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[35] ~~GSM~~3GPP TS ~~09.61~~29.061: "~~Digital cellular telecommunications system (Phase 2+),~~ Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)~~General requirements on interworking between the Public Land Mobile Network (PLMN) supporting General Packet Radio Service (GPRS) and Packet Data Networks (PDN)~~".

[36] ~~GSM 12.00 (ETS 300 612-1): "Digital cellular telecommunications system (Phase 2); Objectives and structure of Network Management (NM)".~~Void.

[37] ~~GSM 12.01: "Digital cellular telecommunications system (Phase 2); Common aspects of GSM Network Management (NM)".~~Void.

[38] ~~GSM 12.13: "Digital cellular telecommunications system (Phase 2); Maintenance of the Mobile services Switching Centre (MSC)".~~Void.

[39] ~~GSM 12.14: "Digital cellular telecommunications system (Phase 2); Maintenance of location registers".~~Void.

[40] ~~GSM 12.20: "Digital cellular telecommunications system (Phase 2); Network Management (NM) procedures and messages".~~Void.

3 Definitions, symbols and abbreviations

Unless listed below, the definitions, symbols and abbreviations are listed in ~~GSM~~3GPP TR ~~01.04~~21.905 and ~~GSM~~3GPP TS ~~03.60~~23.060.

4 Configuration of the Gs interface

The Gs interface connects the Serving GPRS Support Node (SGSN) to the Visitors Location Register (VLR). This interface is defined in the 64 kbit/s for E1 interface and for 64 kbit/s or 56 kbit/s for T1 interface boundary of an SGSN to a VLR or of a VLR to an SGSN. The configuration of the Gs interface shall not impose any restriction on the number of VLRs or SGSNs to be connected by the Gs interface. The Gs interface definition shall support an early implementation of GPRS when one SGSN may be connected to several VLRs or a more mature implementation when several SGSNs may be connected to one VLR. Therefore the interface shall support the use of an STP.

The level of resilience in the Gs interface is determined by the operator, however it is recommended that the operator considers the use of more than one multiplex system between the SGSN and the VLR. Each multiplex system should be used to carry one signalling link and routing diversity should be provided among the signalling links to increase the resilience of the system.

4.1 Use of Protocol Stacks

BSSAP+ shall be transported over SCCP and the transport layers specified in 3GPP TS 29.202. The protocol stack is shown in ~~F~~figure 4.1.

When MTP is used to transport BSSAP+ then the conformance rules specified in ~~section~~ clause 5 shall apply.

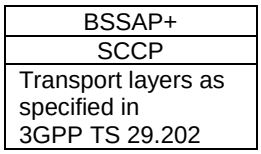

Figure 4.1: Protocol stack for the transportation of BSSAP+

5 Conformance to message transfer part (MTP)

5.1 General

The MTP functions as specified in ITU-T Recommendations Q.702, Q.703, Q.704 and Q.707 for E1 interface and ANSI T1.111 Recommendations for the T1 interface are applicable. However, the following subclauses provide a minimum set of MTP requirements that shall be implemented at a SGSN or VLR to support the functionality required by the BSSAP+ protocol in the Gs interface. The set of exceptions and modifications to those recommendations maintain compatibility with the implementation of a full specification of the MTP. The ITU-T recommendations for~~-~~ E1 interface and ANSI recommendation for T1 interface concerning the MTP shall be taken as requirements unless covered by a statement in th~~is Technical Specificatione~~ present document.

5.2 MTP Level 1

The MTP level 1 exceptions and modifications to ITU-T Recommendation Q.702 and ANSI T1.111 Recommendation can be found in ~~GSM~~3GPP TS ~~08.06~~48.006 subclause 3.2.

5.3 MTP Level 2

5.3.1 MTP Level 2 for E1 Interface

The MTP level 2 exceptions and modifications to ITU-T Recommendation Q.703 are listed below.

- ITU-T Recommendation Q.703~~;~~, subclause 1.4:
  - Only the basic error correction protocol is required.
- ITU-T Recommendation Q.703~~;~~, clause 6:
  - Not applicable, only basic error correction is required.
- ITU-T Recommendation Q.703~~;~~, clause 7:
  - Both the SGSN and the VLR may apply the emergency proving period or the normal proving period in the initial alignment procedure. If all the signalling links between the two entities are unavailable then the SGSN or the VLR shall apply the emergency proving period until one signalling link becomes available.
- ITU-T Recommendation Q.703~~;~~, clause 8:

- The processor outage status indicator shall be recognised at the SGSN and the VLR and the procedures defined in ITU-T Recommendation Q.703 clause 8 supported. The SGSN and the VLR should support the generation of the processor outage indication towards the peer entity if this is appropriate.

5.3.2 MTP Level 2 for T1 Interface

The MTP level 2 exceptions and modifications to ANSI T1.111.3 ~~Recommendation~~ are listed below.

- ANSI ~~Recommendation~~ T1.111.3~~:~~, subclause 1.4:
  - Only the basic error correction protocol is required~~.~~ (~~section~~ subclause 1.4.3 is not required).
- ANSI ~~Recommendation~~ T1.111.3~~:~~, clause 6:
  - Not applicable, only basic error correction is required.
- ANSI ~~Recommendation~~ T1.111.3~~:~~, clause 7:
  - Both the SGSN and the VLR may apply the emergency proving period or the normal proving period in the initial alignment procedure. If all the signalling links between the two entities are unavailable the SGSN or the VLR shall apply the emergency proving period until one signalling link becomes available.
- ANSI ~~Recommendation~~ T1.111.3~~:~~, clause 8:
  - The processor outage status indicator shall be recognised at the SGSN and the procedures defined in ANSI ~~Recommendation~~ T1.111.3 clause 8 supported. The SGSN and the VLR shall support the generation of the processor outage indication towards the peer entity if this is appropriate.

5.4 MTP Level 3

5.4.1 MTP Level 3 for E1 Interface

The Gs interface may be configured as a point to point interface or may use an intermediate SS7 network. In this last case an SGSN or a VLR may act always as end points of the Gs interface (SP functionality) or may be configured to act as an transfer point between a VLR and an SGSN (SP and STP functionality). The MTP level 3 exceptions and modifications to ITU-T Recommendation Q.704 are listed regarding whether the SGSN and the VLR are connected by a point to point link or are configured to act as SPs in an SS7 network or if they support STP functionality.

~~Section~~ Subclause 5.4.1.1 applies to all configurations of the Gs interface. In subclause 5.4.1.2 the exceptions and modifications to ITU-T Recommendation Q.704 are listed depending upon the configuration of the Gs interface, whether it is a point to point interface or the SGSN and VLR act as an SP only or as SP and STP. Subclause~~Section~~ 5.4.1.3 provides points of clarification about the ITU-T Recommendation Q.704.

5.4.1.1 General clauses

The MTP level 3 exceptions and modifications to ITU-T Recommendation Q.704 regardless of whether the SGSN supports STP functionality are listed below.

- ITU-T Recommendation Q.704, subclause 2.3.5:~~.~~
  - Either of the two methods of congestion control is acceptable. The most appropriate method is dependent on national ITU-T No. 7 implementations.
- ITU-T Recommendation Q.704, subclause 2.4 ~~Message discrimination~~:
  - The signalling point code for an SGSN may be included in the national signalling point code scheme or in a separate signalling network.
- ITU-T Recommendation Q.704, subclause 3.8.2:
  - There are two acceptable methods of congestion control defined in ITU-T Recommendation Q.704, in subclauses 3.8.2.1 a) and b). The most appropriate method is dependent on national ITU-T No. 7

implementations. Each administration should specify its congestion threshold setting algorithm and nodal congestion abatement procedures at system procurement.

- ITU-T Recommendation Q.704, clause 12 ~~Signalling link management~~:
  - Only basic link management procedures are required.
- ITU-T Recommendation Q.704, subclause 14.2.1:
  - Since all messages are passed using the SCCP, the service indicator for Gs interface operation will be:

    bits D C B A

    0 0 1 1
- ITU-T Recommendation Q.704, subclause 14.2.2:
  - The sub service field for Gs interface operation will always be set to one of the following values:

    bits D C

    1 0 national network

    1 1 local network
- ITU-T Recommendation Q.704, clause 15:
  - The formats and codes listed are only relevant to the messages that are required, i.e. those not excluded in the rest of this recommendation.

5.4.1.2 Configuration dependent clauses

The MTP level 3 exceptions and modifications to ITU-T Recommendation Q.704 are permitted if the SGSN or the VLR does not support STP functionality are listed below.

- ITU-T Recommendation Q.704~~;~~, subclause 1.1.2:
  - If the Gs interface is configured as a point to point interface, then there will be no signalling network management features which need to be considered.
- ITU-T Recommendation Q.704, clause 2:
  - If STP functionality is not required the discrimination function of the MTP used for GPRS application can be significantly simplified.

NOTE: If the implementation of this interface is for point to point application the routing function within the MTP will be present to select the point code appropriate to the parent VLR.

- ITU-T Recommendation Q.704, subclause 2.3 ~~Message routing function~~:
  - If the implementation of the Gs interface is point to point, load sharing between linksets is not required since there will only be one linkset between SGSN and VLR.
- ITU-T Recommendation Q.704, subclause 2.4 ~~Message discrimination~~:
  - At an SGSN or VLR that does not implement STP functionality, only messages with a correctly checking DPC will be accepted. Others will be discarded. It is recommended that discarding a message because of an incorrectly set point code causes an incident report to be generated.
- ITU-T Recommendation Q.704, subclause 3.1.3 c):
  - In a point to point configuration there is no requirement for signalling route management.
- ITU-T Recommendation Q.704, subclause 3.3.2.3:
  - In a point to point configuration there is no requirement for signalling route management.

- ITU-T Recommendation Q.704, subclause 3.3.3.3:
  - In a point to point configuration there is no requirement for signalling route management.
- ITU-T Recommendation Q.704, subclause 3.3.4.3:
  - In a point to point configuration there is no requirement for signalling route management.
- ITU-T Recommendation Q.704, subclause 3.4.3:
  - Not applicable if no STP functionality is implemented by the SGSN or the VLR.
- ITU-T Recommendation Q.704, subclause 3.5.3:
  - Not applicable if no STP functionality is implemented by the SGSN or the VLR.
- ITU-T Recommendation Q.704, subclause 3.8.5.2:
  - The signalling-route-set-congestion-test procedure is not required.
- ITU-T Recommendation Q.704, subclause 4.1.2:
  - In a point to point configuration signalling routes are not applicable.
- ITU-T Recommendation Q.704, subclause 4.2:
  - The normal routing situation in a point to point configuration will be that there are 1 or more signalling links available between a SGSN and VLR, these will constitute a link set. They will be run in a load sharing mode and changeover, changeback procedures will be supported between these signalling links.
  - The normal routing situation if more than one route is available between the SGSN and the VLR will be that the load sharing, changeover and changeback procedures would be provided between signalling links within the same signalling linkset and between signalling linksets.
- ITU-T Recommendation Q.704, subclause 4.3.3~~.~~:
  - There will be no alternative linkset in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, subclause 4.4.3:~~.~~
  - Not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, subclause 4.5:~~.~~
  - Not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, subclause 4.6:~~.~~
  - Not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, subclause 4.7:
  - Not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, clause 5~~ Changeover~~:
  - Changeover between link sets is not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, clause 6~~ Changeback~~:
  - Changeback between link sets is not applicable in a point to point configuration of the Gs interface.
- ITU-T Recommendation Q.704, clause 7:
  - Forced re-routing is not applicable if there is only one signalling route existing between SGSN and VLR in a point to point configuration of the Gs interface.

- ITU-T Recommendation Q.704, clause 8:

  - Not applicable if there is only one signalling route existing between SGSN and VLR in a point to point configuration of the Gs interface.

- ITU-T Recommendation Q.704, subclause 13.2 ~~Transfer prohibited~~:

  - The transfer prohibited function is not applicable if the SGSN or the VLR does not support STP functionality. ~~-~~At the reception of a TFP message, the SGSN or VLR acting as SP shall process the message.

- ITU-T Recommendation Q.704, subclause 13.3 ~~Transfer allowed~~:

  - The transfer allowed function is not applicable if the SGSN or the VLR does not support STP functionality. At the reception of a TFA-message, the SGSN or VLR acting as SP shall process the message.

- ITU-T Recommendation Q.704, subclause 13.4 ~~Transfer restricted~~:

  - The transfer restricted function is not applicable if the SGSN or the VLR does not support STP functionality. At the reception of the TFR message, the SGSN or VLR acting as SP shall process the message.

- ITU-T Recommendation Q.704, subclause 13.5 ~~Signalling route set test~~:

  - The signalling-route-set-test procedure is not applicable.

- ITU-T Recommendation Q.704, subclauses 13.6, 13.7 and~~,~~ 13.8 ~~Transfer controlled~~:

  - The transfer controlled function is not applicable if the SGSN or the VLR does not support STP functionality. At the reception of TFC message, the SGSN or VLR acting as SP shall process the message.

- ITU-T Recommendation Q.704, subclause 13.9 ~~Signalling route set congestion test~~:

  - The signalling route-set-congestion-test function is not required.

  - At the reception of signalling-route-set-congestion-test message no action is required by the receiving entity.

5.4.1.3 Informative clauses

A list of clarifications to ITU-T Recommendation Q.704 are listed below.

- ITU-T Recommendation Q.704, subclause 2.3.4:~~-~~

  - The load sharing procedures shall allow any value of the SLC field in the MTP3 network management messages that are not related to a specific signalling link. This allows compatibility between blue book implementations where only the 0000 value is used and white book implementations where load sharing may be applicable to network management messages

- ITU-T Recommendation Q.704, subclause 3.4.1:

  - It should be noted that for point to point working, the signalling route will become unavailable when the associated link set fails.

- ITU-T Recommendation Q.704, subclause 3.4.2:

  - It should be noted that for point to point working, the signalling route will become available when the associated link set is restored.

- ITU-T Recommendation Q.704, subclause 3.5.1:

  - It should be noted that for point to point working the procedures used in connection with signalling route unavailability will be those specified for signalling route set unavailability in ITU-T Recommendation Q.704 subclause 11.2.1.

- ITU-T Recommendation Q.704, subclause 3.5.2:

  - It should be noted that for point to point interworking the procedures used in connection with signalling route availability will be those specified for signalling route set availability in ITU-T Recommendation Q.704 subclause 11.2.2.

- ITU-T Recommendation Q.704, clause 9:

  - The SGSN and the MSC/VLR shall implement the restart procedures specified in ITU-T Recommendation Q.704 (03/1993) MTP3. The restart procedure specified in ITU-T Recommendation Q.704 (11/1988) MTP3 shall not be used.

- ITU-T Recommendation Q.704, clause 11:

  - It should be noted that for point to point working the signalling route set will consist of one associated signalling route only.

5.4.2 MTP Level 3 for T1 Interface

The Gs interface may be configured as a point to point interface or may use an intermediate SS7 network. In this last case an SGSN or a VLR may act always as end points of the Gs interface (SP functionality) or may be configured to act as an transfer point between a VLR and an SGSN (SP and STP functionality). The MTP level 3 exceptions and modifications to ANSI ~~Recommendation~~ T1.111.4 are listed regarding whether the SGSN and the VLR are connected by a point to point link or are configured to act as SPs in an SS7 network or if they support STP functionality.

~~Section~~ Subclause 5.4.2.1 applies to all configurations of the Gs interface. In subclause 5.4.2.2 the exceptions and modifications to ANSI ~~Recommendation~~ T1.111.4 are listed depending upon the configuration of the Gs interface, whether it is a point to point interface or the SGSN and VLR act as an SP only or SP and STP. ~~Section~~ Subclause 5.4.2.3 provides points of clarification about the ANSI ~~Recommendation~~ T1.111.4.

5.4.2.1 General clauses

The MTP level 3 exceptions and modifications to ANSI ~~Recommendation~~ T1.111.4 regardless of whether the SGSN supports STP functionality are listed below.

- ANSI T1.111.4 subclause 2.3.5:~~.~~

  - Support of ANSI specific Signalling Link Congestion Control as specified in this subclause is required.

- ANSI T1.111.4 subclause 2.4 ~~Message discrimination~~:

  - The signalling point code for an SGSN may be included in the national signalling point code scheme or in a separate signalling network.

- ANSI T1.111.4 ,subclause 3.8.2:

  - Support of ANSI specific Network Congestion as defined in this subclause is required.

- ANSI T1.111.4, clause 12 ~~Signalling link management~~:

  - Only basic link management procedures are required.

- ANSI T1.111.4, subclause 14.2.1:

  - Since all messages are passed using the SCCP, the service indicator for Gs interface operation will be:

    bits D C B A

    0 0 1 1

- ANSI T1.111.4, subclause 14.2.2:

  - The sub service field for Gs interface operation will always be set to one of the following values:

    bits D C

    1 0 national network

- ANSI T1.111.4, clause 15:

  - The formats and codes listed are only relevant to the messages that are required.

5.4.2.2 Configuration dependent clauses

The MTP level 3 exceptions and modifications to ANSI ~~Recommendation~~ T1.111.4 are permitted if the SGSN or the VLR does not support STP functionality are listed below.

- ANSI T1.111.4~~:~~, subclause 1.1.2:

  - If the Gs interface is configured as point to point interface, i.e., it does not support STP function, then the signalling transfer point network management features are not required.

- ANSI T1.111.4, clause 2:

  - If STP function is not required, then the discrimination functions of the MTP used for GPRS application can be significantly simplified.

  NOTE: If the implementation of this interface is for point to point application the routing function within the MTP will be present to select the point code appropriate to the parent VLR.

- ANSI T1.1114~~.~~, subclause 2.3 ~~Message routing function~~:

  - If the implementation of the Gs ~~-~~interface is point to point, load sharing between linksets is not required since there will only be one linkset between SGSN and VLR.

- ANSI T1.111.4, subclause 2.4 ~~Message discrimination~~:

  - At the SGSN or VLR that does not implement STP functionality, only messages with a correctly checking DPC will be accepted. Other messages will be discarded. It is recommended that when messages are discarded because ~~-~~of an incorrectly set point code, an incident report should be generated.

- ANSI T1.111.4, subclause 3.1.3 (3):

  - In a point to point configuration, there is no requirement for signalling route management.

- ANSI T1.111.4, subclause 3.3.2.3:

  - In a point to point configuration, there is no requirement for signalling route management.

- ANSI T1.111.4, subclause 3.3.3.3:

  - In a point to point configuration, there is no requirement for signalling route management.

- ANSI T1.111.4, subclause 3.3.4.3:

  - In a point to point configuration, there is no requirement for signalling route management.

- ANSI T1.111.4, subclause 3.4.3:

  - Not applicable if no STP functionality is implemented in SGSN or VLR.

- ANSI T1.111.4, subclause 3.5.3:

  - Not applicable if no STP functionality is implemented in SGSN or VLR.

- ANSI T1.111.4, subclause 3.8.5.2:

  - The signalling-route-set-congestion-test procedure is not required.

- ANSI T1.111.4, subclause 4.1.2:

  - In a point to point configuration signalling routes are not applicable.

- ANSI T1.111.4, subclause 4.2:

  - The normal routing situation in a point to point configuration will be that there are 1 or more signalling links available between a SGSN and VLR, these will constitute a link set. They will run in a load sharing mode and changeover, changeback procedures will be supported between these signalling links.

- The normal routing situation if more then one route is available between the SGSN and the VLR will be that the load sharing, changeover and changeback procedures would be provided between signalling links within the same signalling linkset and between signalling linksets.

- ANSI T1.111.4, subclause 4.3.3.:

  - There will be no alternative linkset in a point to point configuration of the Gs interface.

- ANSI T1.111.4, subclause 4.4.3:.

  - Not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, subclause 4.5:.

  - Not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, subclause 4.6:.

  - Not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, subclause 4.7:

  - Not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, clause 5 Changeover:

  - Changeover between link sets is not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, clause 6 Changeback:

  - Changeback between link sets is not applicable in a point to point configuration of the Gs interface.

- ANSI T1.111.4, clause 7:

  - Forced re-routing is not applicable since there is only one signalling route existing between SGSN and VLR in a point to point configuration of the Gs interface.

- ANSI T1.111.4 ,clause 8:

  - Not applicable since there is only one signalling route existing between SGSN and VLR in a point to point configuration of the Gs interface.

- ANSI T1.111.4, subclause 13.2 Transfer prohibited:

  - The transfer prohibited function is not applicable if the SGSN does not support STP functionality. At the reception of a TFP message, the SGSN or VLR acting as SP shall process the message.

- ANSI T1.111.4, subclause 13.3 Transfer allowed:

  - The transfer allowed function is not applicable if the SGSN does not support STP functionality. At the reception of a TFA-message, the SGSN or VLR acting as SP shall process the message.

- ANSI T1.111.4, subclause 13.4 Transfer restricted:

  - The transfer restricted function is not applicable if the SGSN does not support STP functionality. At the reception of the TFR message the SGSN or VLR acting as SP shall process the message.

- ANSI T1.111.4, subclause 13.5 Signalling route set test:

  - The signalling-route-set-test procedure is not applicable.

- ANSI T1.111.4, subclauses 13.6, 13.7 ,and 13.8 Transfer controlled:

  - The transfer controlled function is not applicable if the SGSN does not support STP functionality. At the reception of TFC message, the SGSN or VLR acting as SP shall process the message.

- ANSI T1.111.4, subclause 13.9 Signalling route set congestion test:

- The signalling route-set-congestion-test function is not applicable. ~~-~~At the reception of signalling-route-set-congestion-test message no action is taken by the receiving entity.

5.4.2.3 Informative clauses

A list of clarifications to ANSI Recommendation T1.111.4 are listed below.

- ANSI T1.111.4, subclause 2.3.4:~~.~~
  - The load sharing procedures shall allow any value of the SLS field in the MTP3 network management messages that are not related to a specific signalling link or a default value of 00000000 should be used.
- ANSI T1.111.4, subclause 3.4.1:
  - For point to point working, the signalling route will become unavailable when the associated link set fails.
- ANSI T1.111.4, subclause 3.4.2:
  - For point to point working, the signalling route will become available when the associated link set is restored.
- ANSI T1.111.4, subclause 3.5.1:
  - For point to point working, the procedures used in connection with signalling route unavailability will be those specified for signalling route set unavailability in ANSI Recommendation T1.111.4 subclause 11.2.1.
- ANSI T1.111.4, subclause 3.5.2:
  - For point to point working, the procedures used in connection with signalling route availability will be those specified for signalling route set availability in ANSI Recommendation T1.111.4 subclause 11.2.2.
- ANSI T1.111.4, clause 9:
  - The SGSN and the MSC/VLR shall implement the restart procedures specified in ANSI T1.111.4.
- ANSI T1.111.4, clause 11:
  - For point to point working, the signalling route set will consist of one associated signalling route only.

6 Conformance to SCCP

6.1 Overview

The purpose of this clause is to identify the subset of the SCCP functions which are necessary to provide addressing, error detection and segmentation facilities in the Gs interface. If this subset of SCCP functions is implemented, compatibility with a full ITU-T or ANSI SCCP shall be maintained. Only the needs of the user of SCCP (refer to ~~GSM~~3GPP TS ~~09.18~~29.018) are taken into account in this clause: the operations and maintenance requirements about SCCP functions are outside the scope of ~~this technical specification~~the present document.

No SCCP translation function is required in the VLR or the SGSN between the national and the local MTP. The Destination Point Code and Subsystem Number would allow direct routing by the local SCCP and MTP. Global Title addressing is supported on the Gs interface to provide flexibility in the addressing scheme implementation (note that the SGSN is assigned a global title in order to communicate with an HLR across an inter PLMN boundary).

Only connectionless class 0 SCCP services are used on the Gs interface. These simplifications are applicable to the signalling between an SGSN and a VLR in GSM PLMNs.

The minimum set of SCCP functions which apply are specified in the ITU-T Recommendations Q.711, Q.712, Q.713 and Q.714, for E1 interface and ANSI T1.112 for T1 interface with the qualifications specified in this Recommendation.

6.2 SCCP Primitives

6.2.1 SCCP Primitives for E1 Interface (ITU Recommendation) Q.711)

- ITU-T Recommendation Q.711, subclause 1:
  - No SCCP connection-oriented services are used.
- ITU-T Recommendation Q.711, subclause 2:
  - No SCCP connection-oriented services are used. Only connectionless class 0 is used.
- ITU-T Recommendation Q.711, subclause 2.1:
  - Not applicable.
- ITU-T Recommendation Q.711, subclause 4.1:
  - Connection-oriented functions are not applicable

6.2.2 SCCP Primitives for T1 Interface (ANSI Standards T1.112.1))

- ANSI T1.112.1, clause 1:
  - No SCCP connection-oriented services are used.
- ANSI T1.112.1, clause 2:
  - No SCCP connection-oriented services are used. Only connectionless class 0.
- ANSI T1.112.1, subclause 2.1:
  - Not applicable.
- ANSI T1.112.1, subclause 4.1:
  - Connection-oriented functions are not applicable.

6.3 SCCP messages

6.3.1 SCCP messages for E1 Interface (ITU Recommendation Q.712)

- ITU-T Recommendation Q.712, subclauses 1.1 to 1.14:
  - Messages not used.
- ITU-T Recommendation Q.712, subclause 1.16:
  - The Subsystem-Out-Of-Service-Grant (SOG) message is not used.
- ITU-T Recommendation Q.712, subclause 1.17:
  - The Subsystem-Out-Of-Service-Request (SOR) message is not used.
- ITU-T Recommendation Q.712, subclauses 2.4, 2.6, 2.7, 2.9, 2.11, 2.12, 2.13, 2.14, 2.16 and 2.17:
  - Parameters not used.

6.3.2 SCCP messages for T1 Interface (ANSI Standards T1.112.2)

- ANSI T1.112.2, subclauses 2.1 to 2.14:
  - Messages not used.

- ANSI T1.112.2, subclause 3.4:
  - The Subsystem-Out-Of-Service-Request (SOR) message is not used.
- ANSI T1.112.2, subclause 3.5:
  - The Subsystem-Out-Of-Service-Grant (SOG) message is not used.
- ANSI T1.112.2, subclause 3.6:
  - The Subsystem-Backup Routing (SBR) (Optional) message is not used.
- ANSI T1.112.2, subclause 3.7:
  - The Subsystem-Normal Routing (SNR) (Optional) message is not used.
- ANSI T1.112.2, subclause 3.8:
  - The Subsystem-Routing Status Test (SRT) (Optional) message is not used.
- ANSI T1.112.2, subclauses 4.2, 4.4, 4.6, 4.7, 4.10, 4.11, 4.12, 4.13, 4.15, 4.16, 4.17, 4.18, and 4.19:
  - Parameters not used.

6.4 SCCP formats and codes

6.4.1 SCCP format and codes for E1 Interface (ITU Recommendation Q.713)

- ITU-T Recommendation Q.713, subclause 3.4:
  - The called party address shall include the appropriate sub system number. All other aspects of SCCP addressing are network specific.
- ITU-T Recommendation Q.713, subclause 3.4.2.2:
  - SSN value:
    - This is a national network concern. Different SSN values can be allocated for SGSN and VLR.
- ITU-T Recommendation Q.713, subclause 3.5:
  - The calling party address shall include the appropriate sub system number. All other aspects of SCCP addressing are network specific.
- ITU-T Recommendation Q.713, subclause 3.6:
  - Protocol class: the classes 1, 2 and 3 are not used.
- ITU-T Recommendation Q.713, subclauses 3.7 3.8, 3.9, 3.10, 3.11, 3.13, 3.14, and 3.15:
  - Parameters not used.
- ITU-T Recommendation Q.713, subclauses 4.2 to 4.9 and 4.12 to 4.17:
  - Messages not used.
- ITU-T Recommendation Q.713, subclause 5.1.1:
  - SOR and SOG not needed.

6.4.2 SCCP format and codes for T1 Interface (ANSI Standards T1.112.3)

- ANSI T1.112.3, subclause 3.4:

- The called party address shall include the appropriate sub system number. All other aspects of SCCP addressing are network specific.

- ANSI T1.112.3, subclause 3.4.2.1:
  - The SSN values are a national network concern. Different SSN values can be allocated for SGSN and VLR.
- ANSI T1.112.3, subclause 3.5:
  - The calling party address shall include the appropriate sub-system number. All other aspects of SCCP addressing are network specific.
- ANSI T1.112.3, subclause 3.6-:
  - Protocol class: the classes -2 and 3 are not used.
- ANSI T1.112.3, subclauses 3.7, 3.8, 3.9, 3.10, 3.11, 3.13, 3.14~~,~~ and 3.15:
  - Parameters not used.
- ANSI T1.112.3, subclauses 4.2 to 4.9 and 4.12 to 4.17:
  - Messages not used.
- ANSI T1.112.3, subclause 5.1.1-:
  - SOR, SNR, SRT, SBR, and SOG not needed.

6.5 SCCP procedures

6.5.1 SCCP procedures for E1 Interface (ITU Recommendation Q.714)

- ITU-T Recommendation Q.714, subclauses 1.1.2 and~~,~~ 1.1.3:
  - Protocol classes 2 and 3 not used.
  - Connection-oriented services are not used.
- ITU-T Recommendation Q.714, subclause 1.2:
  - Connection-oriented services are not used.
- ITU-T Recommendation Q.714, subclause 1.3:
  - Protocol class 1 not used.
- ITU-T Recommendation Q.714, subclause 2.1:
  - The two basic categories of addresses for conectionless messages are used.
- ITU-T Recommendation Q.714, subclause 2.2 and~~,~~ 2.3:
  - No connection-oriented message is used.
- ITU-T Recommendation Q.714, clause 3:
  - Connection-oriented procedures are not used.
- ITU-T Recommendation Q.714, clause 5:
  - Only those messages and procedures relating to non-replicated subsystems or nodes are required.

6.5.2 SCCP procedures for T1 Interface (ANSI Standards T1.112.4)

- ANSI T1.112.4, subclauses 1.1.2 and~~,~~ 1.1.3:

- Protocol classes – 2 and 3 not used.
- Connection-oriented services are not used.

- ANSI T1.112.4, subclause 1.2:
  - Connection-oriented services are not used.
- ANSI T1.112.4, subclause 1.3:
  - Protocol class 1 is not used.
- ANSI T1.112.4, subclause 2.1:
  - The two basic categories of addresses for connectionless messages are used.
- ANSI T1.112.4, subclause 2.2 and 2.3:
  - No connection-oriented message is used.
- ANSI T1.112.4, clause 3:
  - Connection-oriented procedures not used.
- ANSI T1.112.4, clause 5:
  - Only those messages and procedures relating to non-replicated subsystems or nodes are required.

7 Use of the SCCP (E1/T1 Interface)

The underlying transport stack and the SCCP are used to support signalling messages between the SGSN and the MSC. The BSSAP+ protocol specified in GSM3GPP TS 09.1829.018 is the user of the SCCP. GSM3GPP TS 09.1829.018 only uses the services of the class 0 of the SCCP.

The Gs interface connects an SGSN to a VLR within the same PLMN. The use of point codes or global titles is allowed for routing of SCCP messages.

The format and coding of address parameters carried by the SCCP for routing purpose shall comply with ITU-T Recommendation Q.713 for E1 interface and ANSI T1.112.3 T1 interface with the following restrictions:

- The called party address shall include:
  - an SSN (see subclause 6.4.1 E1 interface and subclause 6.4.2 for T1 interface);
  - Aall other aspects of the SCCP signalling are specified in GSM3GPP TS 09.0229.002.
- The calling party address shall include:
  - an SSN (see subclause 6.4.1 E1 interface and subclause 6.4.2 for T1 interface);
  - Aall other aspects of the SCCP signalling are specified in GSM3GPP TS 09.0229.002.

When an SCCP message is sent, the Called Party Address is derived from the Called Address of the N-UNITDATA-REQUEST primitive issued by the local SCCP user.

When an SCCP message is received, the Calling Address within the N-UNITDATA-INDICATION primitive is derived from the Calling Party Address of the SCCP UNITDATA message received.

Only address information belonging to the E.164 numbering plan is allowed to be included as Global Title in the Called and Calling Party Address. The SGSN and the VLR store the address of the other entity using the format received in the Calling Party Address field or the address information received in the application part of the message.

Annex A (informative): Change history

Change history						
TSG CN#	Spec	Version	CR	<Phase>	New Version	Subject/Comment
Apr 1999	GSM 09.16	7.0.0				Transferred to 3GPP CN1
CN#03	29.016				3.0.0	Approved at CN#03

TSG Meet-ing	TSG Doc number	TSG WG doc number	CR	Rev	Ph	Cat	Vers Old	Vers New	Subject	Date
NP-09	NP-000441	N1-001017	004	1	R99	F	3.0.0	3.1.0	Different SSNs for SGSN and VLR	09-2000
NP-11	NP-0100150	N1-010459	005	1	Rel-4	C	3.1.0	4.0.0	BSSAP+ over IP according to SIGTRAN	03-2001

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020854***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **29.018** **CR** **030** ⌘ **rev** **-** ⌘ Current version: **4.3.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Various clean-up of wrong references, as eg 24.008 instead of 44.018
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4
Date:	⌘	27.03.2002
Category:	⌘	**F**
Release:	⌘	Rel-4

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

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

Reason for change:	⌘	Wrong reference used, and several updates on references were missing.
Summary of change:	⌘	TS 01.04 replaced by TR 21.905. 02.06 stopped with R98 and transferred to 3GPP as 22.101 (Service aspects; Service principles),- but proposed deleted as 02.06 is not refered to in the text of 29.018). 02.07 stopped with R98 and transferred to 3GPP as 22.907 which is withdrawn from R99. 03.18 was not in the reference list, and is replaced by 23.018. 03.64, 04.64 and 04.65,- transferred to 3GPP as 43.064, 44.064,and 44.065 respectively. 24.008 wrongly referenced,- 44.018 is introduced for “Channel needed” definition. 08.08, 08.18 and 08.60 , transferred to 3GPP as 48.008, 48.018,and 48.060 respectively. 09.08, 01.61 and 02.09,- transferred to 3GPP as 49.008, 41.061,and 42.009 respectively. 02.08 only existed for Phase 1, while 03.61 and 03.62 are withdrawn. 02.17, 04.01, 04.03, 04.04, 04.05, 04.06 and 04.22,- transferred to 3GPP as 42.017, 44.001, 44.003, 44.004, 44.005, 44.006 and 24.022 respectively. 08.06, 08.14 and 08.16,- transferred to 3GPP as 48.006, 48.014,and 48.016 respectively. 12.00, 12.01, 12.02, 12.13, 12.14, 12.20 and 12.22 existed only before R99 (phase 1 or 2). 12.03 existed for R99.
Consequences if not approved:	⌘	Misleading text.

Clauses affected:	⌘	2, 3, 5, 14, 18 and 20
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

2.1 Normative references

[1] ~~3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".~~[Void]

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

[2] ~~3GPP TS 02.06: "Digital cellular telecommunications system (Phase 2+); Types of Mobile Stations (MS)".~~[Void]

[3] ~~3GPP TS 02.07: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) features".~~[Void]

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

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

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

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

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

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

[9] 3GPP TS ~~03.64~~43.064: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Overall description of the GPRS radio interface; Stage 2".

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

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

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

[12] 3GPP TS ~~04.64~~44.064: "~~Digital cellular telecommunications system (Phase 2+), General Packet Radio Service (GPRS);~~ Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[13] 3GPP TS ~~04.65~~44.065: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[14] 3GPP TS ~~08.08~~48.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".

[15] 3GPP TS ~~08.18~~48.018: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[16] 3GPP TS ~~08.60~~48.060: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."

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

[18] 3GPP TS ~~09.08~~49.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Application of the Base Station System Application Part (BSSAP) on the E-interface".

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

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

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

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

2.2 Informative references

[22A] 3GPP TS ~~01.61~~41.061: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ GPRS ciphering algorithm requirements".

[23] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".

[24] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".

[25] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[26] ~~3GPP TS 02.08: "Digital cellular telecommunications system (Phase 2+); Quality of Service (QoS) / GSM system performance".~~[Void]

[27] 3GPP TS ~~02.09~~42.009: "~~Digital cellular telecommunications system (Phase 2+);~~ Security aspects".

[28] 3GPP TS 22.011: "Service accessibility".

[29] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[30] 3GPP TS ~~02.17~~42.017: "~~Digital cellular telecommunications system (Phase 2+);~~ Subscriber Identity Modules (SIM); Functional characteristics".

[31] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)".

[32] ~~3GPP TS 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".~~[Void]

[33] ~~3GPP TS 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call; Stage 2".~~[Void]

[34] 3GPP TS ~~04.01~~44.001: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS-BSS) interface; General aspects and principles".

[35] 3GPP TS 24.002: "GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[36] 3GPP TS ~~04.03~~44.003: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".

[37] 3GPP TS ~~04.04~~44.004: "~~Digital cellular telecommunications system (Phase 2+);~~ Layer 1 General requirements".

[38] 3GPP TS ~~04.05~~44.005: "~~Digital cellular telecommunications system (Phase 2+);~~ Data Link (DL) layer General aspects".

[39] 3GPP TS ~~04.06~~44.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[40] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[41] 3GPP TS ~~04.22~~24.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS-BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[42] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".

[43] 3GPP TS ~~08.06~~48.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[44] 3GPP TS ~~08.14~~48.014: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".

[45] 3GPP TS ~~08.16~~48.016: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS); Serving GPRS Support Node (SGSN) interface; Network Service".

[46] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[47] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)".

[48] ~~3GPP TS 12.00 (ETS 300 612-1): "Digital cellular telecommunications system (Phase 2+); Network Management (NM); Part 1: Objectives and structure of network management".~~[Void]

[49] [Void]~~3GPP TS 12.01 (ETS 300 612-2): "Digital cellular telecommunications system (Phase 2+); Network Management (NM); Part 2: Common aspects of GSM/DCS 1800 network management".~~

[50] [Void]~~3GPP TS 12.02: "Digital cellular telecommunications system (Phase 2+); Subscriber, Mobile Equipment (ME) and services data administration".~~

[51] [Void]~~3GPP TS 12.03: "Digital cellular telecommunications system (Phase 2+); Security management".~~

[52] [Void]~~3GPP TS 12.13: "Digital cellular telecommunications system (Phase 2+); Maintenance of the Mobile services Switching Centre (MSC)".~~

[53] [Void]~~3GPP TS 12.14: "Digital cellular telecommunications system (Phase 2+); Maintenance of location registers".~~

[54] [Void]~~3GPP TS 12.20: "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) Management Information".~~

[55] [Void] ~~3GPP TS 12.22: "Digital cellular telecommunications system (Phase 2+); Interworking of GSM Network Management (NM) procedures and messages at the Base Station Controller (BSC)".~~

[56] ITU-T Recommendations I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[57] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities".

[58] ITU-T Recommendation Q.702: "Signalling data link".

[59] ITU-T Recommendation Q.703: "Signalling link".

[60] ITU-T Recommendation Q.704: "Signalling network functions and messages".

[61] ITU-T Recommendation Q.711 (03/93): "Functional description of the signalling connection control part".

[62] ITU-T Recommendation Q.712 (03/93): "Definition and function of signalling connection control part messages".

[63] ITU-T Recommendation Q.713 (03/93): "Signalling connection control part formats and codes".

[64] ITU-T Recommendation Q.714 (03/93): "Signalling connection control part procedures".

[65] ANSI T1.111 (1996): "Signalling System No. 7 (SS7); Message Transfer Part".

[66] ANSI T1.112 (1996): "Signalling System No. 7 (SS7); Signalling Connection Control Part Functional Description".

3 Definitions, symbols and abbreviations

For the purposes of the present document the definitions, symbols and abbreviations given in 3GPP TR~~S 01.04~~21.905 and in 3GPP TS 23.060 apply.

5.2.1 Paging Initiation

When a VLR has to page a GPRS MS it shall check whether the MSC has an SCCP connection for that MS. If no SCCP connection exists the VLR checks the state of the association to an SGSN and the value of the restoration indicators for that MS. The VLR sends BSSAP+-PAGING-REQUEST messages to the SGSN if the state of the association for the MS is Gs-ASSOCIATED, LA-UPDATE-PRESENT or if the state of the association is Gs-NULL and the 'Confirmed by Radio Contact' restoration indicator is set to 'false'. The sending of the BSSAP+-PAGING-REQUEST message does not change the state of the association with the SGSN.

If the 'Confirmed by Radio Contact' restoration indicator is set to 'true', the VLR shall include the Location area identifier IE into the BSSAP+-PAGING-REQUEST message, otherwise (i.e. after a VLR failure) the Location area identifier IE shall not be included. When sending the BSSAP+-PAGING-REQUEST message, the VLR shall start timer T5.

If the state of the association is Gs-NULL and the restoration indicator 'Confirmed by Radio Contact' is set to 'false', the VLR shall also perform a search procedure as specified in 3GPP TS ~~03.18~~23.018.

5.3 Procedures in the SGSN

The SGSN accepts BSSAP+-PAGING-REQUEST messages in any state of the association apart from Gs-NULL. Nevertheless the SGSN also accepts BSSAP+-PAGING-REQUEST messages in the Gs-NULL state if the 'SGSN-Reset' restoration indicator at the SGSN is set to 'true'. When an SGSN receives a BSSAP+-PAGING-REQUEST message from a VLR, the SGSN shall first check if the MS is known by the SGSN. The handling of the paging request depends on the state of the association and the MM context variables at the SGSN:

a) The MS is known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'false':

- If the MS is considered to be IMSI attached for GPRS and non-GPRS services (i.e. the association is not in the state Gs-NULL), the SGSN shall page the MS based on the location information stored in the SGSN.

- If the MS is marked as IMSI detached for GPRS services or IMSI (implicitly or explicitly) detached for non-GPRS services (i.e. the state of the association is Gs-NULL), the SGSN shall return a BSSAP+-PAGING-REJECT message to that VLR indicating in the Gs Cause IE the detach circumstance ('IMSI detached for GPRS services', 'IMSI detached for non-GPRS services' or 'IMSI implicitly detached for non-GPRS services').

- If the MS is marked as unreachable (i.e. the PPF flag is set to 'false') the SGSN shall return a BSSAP+-MS-UNREACHABLE message to that VLR indicating in the Gs Cause IE 'MS unreachable'. The state of the association does not change at the SGSN.

b) The MS is known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'true':

- If the BSSAP+-PAGING-REQUEST message includes the Location area identifier IE, the SGSN shall page the MS in all the routeing areas served by the SGSN that are included in the location area indicated in the Location area identifier IE.

- If the BSSAP+-PAGING-REQUEST message does not include the Location area identifier IE, the SGSN may page in all the routeing areas served by the SGSN that are also served by the sending VLR.

c) The MS is not known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'false':

- The SGSN shall return a BSSAP+-PAGING-REJECT message to that VLR indicating in the Gs Cause IE 'IMSI unknown'.

d) The MS is not known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'true':

- If the VLR provides the Location area identifier IE, the SGSN shall page within the location area indicated by the VLR. Otherwise the SGSN may page in all the routeing areas served by the SGSN that are also served by the sending VLR.

If the SGSN accepts the paging request, the SGSN shall process the BSSAP+-PAGING-REQUEST message before sending the message on the Gb interface. The result of the processing on the BSSAP+-PAGING-REQUEST message is the PAGING CS message (see 3GPP TS ~~08.18~~48.018) sent on the Gb interface.

The SGSN shall not retransmit the PAGING CS message.

If within a location area there are cells that do not support GPRS services, the SGSN shall group these cells under a 'null RA'. The SGSN will perform the paging procedure described above within both the RA(s) derived from the location information and the 'null RA(s)' of the corresponding location area(s) (see 3GPP TS 24.008).

NOTE: The eMLPP priority information element relates to relative priorities within the paged MS and not to the priority in the sending of PAGING CS messages by the BSS.

14.1 General description

The MS Information procedure is used by the VLR to request specific parameters about the MS. If the target MS for an MS Information procedure or a Provide Subscriber Info procedure (see 3GPP TS ~~03.18~~23.018 and 3GPP TS 29.002) is GPRS attached (i.e. the state of the association to Gs-ASSOCIATED) the VLR may decide to perform the procedure via GPRS. The outcome of the MS Information procedure does not change the state of the association at the VLR or SGSN.

18.4 Information elements

18.4.1 Cell global identity

This information element uniquely identifies one cell.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3 to Octet 10	The rest of the information element is coded as the the value part of the cell global id IE defined in 3GPP TS ~~08.18~~48.018 (not including 3GPP TS ~~08.18~~48.018 IEI and 3GPP TS ~~08.18~~48.018 length indicator).							

Figure 18.4.1/3GPP TS 29.018: Cell global identity IE

18.4.2 Channel needed

The purpose of the *Channel Needed* information element is to indicate which type of channel is needed for the transaction linked to the paging procedure.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	The rest of the information element is coded as the IEI part and the value part of the Channel Needed IE defined in 3GPP TS ~~24.008~~44.018.							

Figure 18.4.2/3GPP TS 29.018: Channel needed IE

18.4.3 Downlink Tunnel Payload Control and Info

This information element is used to convey the payload of octets to be delivered to the identified mobile.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Spare	TOM Protocol Discriminator				E	Tunnel Priority	
Octet 4 to Octet n	Tunnel payload							

TOM Protocol Discriminator: Identifies the protocol using tunnelling of non-GSM signalling. For coding, see 3GPP TS ~~04.64~~44.064.

E: Cipher Request. When set to 1 indicates that the SGSN shall cipher the payload, when set to 0 indicates that the SGSN shall not cipher the payload.

Tunnel Priority: Indicates the priority of the Tunnel Payload. For coding, see table 20.1: Association between Tunnel Priority and LLC SAPs.

Figure 18.4.3/3GPP TS 29.018: Downlink Tunnel Payload Control and Info IE

18.4.4 eMLPP Priority

This element indicates the eMLPP-Priority.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	The rest of the information element is coded as the value part of the eMLPP-Priority IE defined in 3GPP TS ~~08.08~~48.008 (not including 3GPP TS ~~08.08~~48.008 IEI and 3GPP TS ~~08.08~~48.008 length indicator).							

Figure 18.4.4/3GPP TS 29.018: eMLPP Priority IE

18.4.7 Gs cause

The purpose of the value part of the Gs Cause information element is to indicate an error to the receiving entity. This could be a protocol data error or to indicate to the VLR the reason why a paging procedure could not be performed.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Gs Cause value							

Figure 18.4.7/3GPP TS 29.018: Gs Cause IE

Table 18.4.7/3GPP TS 29.018: Gs Cause IE value part

Gs Cause value (octet 3) Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	*Normal, unspecified* in this version of the protocol.
0 0 0 0 0 0 0 1	IMSI detached for GPRS services
0 0 0 0 0 0 1 0	IMSI detached for GPRS and non-GPRS services
0 0 0 0 0 0 1 1	IMSI unknown
0 0 0 0 0 1 0 0	IMSI detached for non-GPRS services
0 0 0 0 0 1 0 1	IMSI implicitly detached for non-GPRS services
0 0 0 0 0 1 1 0	MS unreachable
0 0 0 0 0 1 1 1	Message not compatible with the protocol state
0 0 0 0 1 0 0 0	Missing mandatory information element
0 0 0 0 1 0 0 1	Invalid mandatory information
0 0 0 0 1 0 1 0	Conditional IE error
0 0 0 0 1 0 1 1	Semantically incorrect message
0 0 0 0 1 1 0 0	Message unknown
0 0 0 0 1 1 0 1	Address error
0 0 0 0 1 1 1 0	TOM functionality not supported
0 0 0 0 1 1 1 1	Ciphering request cannot be accommodated
0 0 0 1 0 0 0 0 to 1 1 1 1 1 1 1 1	*Normal, unspecified* in this version of the protocol

NOTE: *'Normal, unspecified'* has the same meaning than in 3GPP TS 24.008, informative Annex H (~~GSM~~UMTS specific cause values for call control). It is used to report a normal event, and should not be interpreted as syntactically incorrect nor unknown if received.

18.4.14 Location area identifier

This element uniquely identifies one Location Area.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length Indicator							
Octet 3 - Octer 7	The rest of the information element is coded as the value part of the location area identifier IE defined in 3GPP TS ~~08.18~~48.018 (not including 3GPP TS ~~08.18~~48.018 IEI and 3GPP TS ~~08.18~~48.018 length indicator).							

Figure 18.4.14/3GPP TS 29.018: Location area identifier IE

18.4.25 Uplink Tunnel Payload Control and Info

This information element is used to convey the payload of octets received from the mobile to the appropriate non-GSM MSC/VLR.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Spare	TOM Protocol Discriminator				E	Tunnel Priority	
Octet 4 to Octet n	Tunnel payload							

TOM Protocol Discriminator: Identifies the protocol using tunnelling of non-GSM signalling. For coding, see 3GPP TS ~~04.64~~44.064.

E: Cipher Request. When set to 1 indicates that the SGSN received the payload in ciphered form, when set to 0 indicates that the SGSN did not receive the payload in ciphered form.

Tunnel Priority: Indicates the priority of the Tunnel Payload. For coding, see Table 20.1: Association between Tunnel Priority and LLC SAPs.

Figure 18.4.25/3GPP TS 29.018:Upnlink Tunnel Payload Control and Info IE

20.2 Procedures in the SGSN

A message received by the SGSN from an MS or sent by the SGSN to an MS on one of the Tunneling of Messages (TOM) LLC SAPs is called a *TOM Protocol Envelope* (see 3GPP TS ~~04.64~~44.064). The *TOM Protocol Envelope* is composed of the *TOM Protocol Header* immediately followed by a *Message Capsule*.

Upon receipt of a *TOM Protocol Envelope* with a *TOM Protocol Header* indicating the presence of one or more non-GSM signalling messages, the SGSN shall determine the non-GSM MSC/VLR to which the *Message Capsule* in the *TOM Protocol Envelope* shall be forwarded. The SGSN shall make this determination based upon the RAI of the MS, the *TOM Protocol Discriminator* field in the *TOM Protocol Header*, and *TOM Protocol Discriminator* specific information in the remaining octets (if any) in the *TOM Protocol Header*. The SGSN shall then forward a BSSAP+-UPLINK-TUNNEL-REQUEST message to the selected non-GSM MSC/VLR with the received *Message Capsule* in the *Tunnel Payload* field. The *Protocol Discriminator* field in the BSSAP+-UPLINK-TUNNEL-REQUEST message shall be set based on the *TOM Protocol Discriminator* in the *TOM Protocol Envelope*. *Tunnel Priority* field in the BSSAP+-UPLINK-TUNNEL-REQUEST message shall be set based on the LLC SAP on which the *TOM Protocol Envelope* was received. The *E* field shall be set to 1 if the *TOM Protocol Envelope* was received by the LLC in ciphered form, otherwise it shall be set to 0.

Upon receipt of a BSSAP+-DOWNLINK-TUNNEL-REQUEST message from a non-GSM MSC/VLR, the SGSN shall construct a *TOM Protocol Envelope* by mapping the *Tunnel Payload* field to the *Message Capsule* portion of the *TOM Protocol Envelope*. The *TOM Protocol Header* shall be constructed based on the *Protocol Discriminator* in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message. The SGSN shall then send the *TOM Protocol Envelope* to the MS on a specific LLC SAP. That LLC SAP shall be determined by the *Tunnel Priority* field in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message. LLC ciphering shall be enabled or disabled based upon the value of the *E* field in this message. If the SGSN is unable to send the *TOM Protocol Envelope* to the indicated MS for any reason, including the inability to accommodate the ciphering request as indicated in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message, then it shall send a BSSAP+-MOBILE-STATUS message to the non-GSM MSC/VLR with an appropriate *Gs Cause* code.

The association between the LLC SAPs and the *Tunnel Priority* shall be as in the following table, where 00 is top-most priority and 11 is lowest priority.

Table 20.1: Association between Tunnel Priority and LLC SAPs

Tunnel Priority	LLC SAP
00	TOM2
01	Not defined
10	TOM8
11	Not defined

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020855***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **29.018** **CR** **031** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE X Radio Access Network X Core Network X

Title:	⌘	Various clean-up of wrong references, as eg 24.008 instead of 44.018
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4 ***Date:*** ⌘ 30.03.2002
Category:	⌘	**A** ***Release:*** ⌘ Rel-5

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

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

Reason for change: ⌘ Wrong reference used, and several updates on references were missing.

Summary of change: ⌘
TS 01.04 replaced by TR 21.905.
02.06 stopped with R98 and transferred to 3GPP as 22.101 (Service aspects; Service principles),- but proposed deleted as 02.06 is not refered to in the text of 29.018).
02.07 stopped with R98 and transferred to 3GPP as 22.907 which is withdrawn from R99.
03.18 was not in the reference list, and is replaced by 23.018.
03.64, 04.64 and 04.65,- transferred to 3GPP as 43.064, 44.064,and 44.065 respectively.
24.008 wrongly referenced,- 44.018 is introduced for “Channel needed” definition.
08.08, 08.18 and 08.60 , transferred to 3GPP as 48.008, 48.018,and 48.060 respectively.
09.08, 01.61 and 02.09,- transferred to 3GPP as 49.008, 41.061,and 42.009 respectively.
02.08 only existed for Phase 1, while 03.61 and 03.62 are withdrawn.
02.17, 04.01, 04.03, 04.04, 04.05, 04.06 and 04.22,- transferred to 3GPP as 42.017, 44.001, 44.003, 44.004, 44.005, 44.006 and 24.022 respectively.
08.06, 08.14 and 08.16,- transferred to 3GPP as 48.006, 48.014,and 48.016 respectively.
12.00, 12.01, 12.02, 12.13, 12.14, 12.20 and 12.22 existed only before R99 (phase 1 or 2).
12.03 existed for R99.

Consequences if not approved: ⌘ Misleading text.

Clauses affected: ⌘ 2, 3, 5, 14, 18 and 20

Other specs affected: ⌘
☐ Other core specifications ⌘
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

2.1 Normative references

[1] ~~3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".~~[Void]

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

[2] ~~3GPP TS 02.06: "Digital cellular telecommunications system (Phase 2+); Types of Mobile Stations (MS)".~~[Void]

[3] ~~3GPP TS 02.07: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) features".~~[Void]

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

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

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

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

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

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

[9] 3GPP TS ~~03.64~~43.064: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Overall description of the GPRS radio interface; Stage 2".

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

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

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

[12] 3GPP TS ~~04.64~~44.064: "~~Digital cellular telecommunications system (Phase 2+), General Packet Radio Service (GPRS);~~ Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[13] 3GPP TS ~~04.65~~44.065: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[14] 3GPP TS ~~08.08~~48.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".

[15] 3GPP TS ~~08.18~~48.018: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[16] 3GPP TS ~~08.60~~48.060: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."

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

[18] 3GPP TS ~~09.08~~49.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Application of the Base Station System Application Part (BSSAP) on the E-interface".

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

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

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

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

2.2 Informative references

[22A] 3GPP TS ~~01.61~~41.061: "~~Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS);~~ GPRS ciphering algorithm requirements".

[23] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".

[24] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".

[25] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[26] ~~3GPP TS 02.08: "Digital cellular telecommunications system (Phase 2+); Quality of Service (QoS) / GSM system performance".~~[Void]

[27] 3GPP TS ~~02.09~~42.009: "~~Digital cellular telecommunications system (Phase 2+);~~ Security aspects".

[28] 3GPP TS 22.011: "Service accessibility".

[29] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[30] 3GPP TS ~~02.17~~42.017: "~~Digital cellular telecommunications system (Phase 2+);~~ Subscriber Identity Modules (SIM); Functional characteristics".

[31] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)".

[32] ~~3GPP TS 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".~~[Void]

[33] ~~3GPP TS 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call; Stage 2".~~[Void]

[34] 3GPP TS ~~04.01~~44.001: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS-BSS) interface; General aspects and principles".

[35] 3GPP TS 24.002: "GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[36] 3GPP TS ~~04.03~~44.003: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".

[37] 3GPP TS ~~04.04~~44.004: "~~Digital cellular telecommunications system (Phase 2+);~~ Layer 1 General requirements".

[38] 3GPP TS ~~04.05~~44.005: "~~Digital cellular telecommunications system (Phase 2+);~~ Data Link (DL) layer General aspects".

[39] 3GPP TS ~~04.06~~44.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[40] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[41] 3GPP TS ~~04.22~~24.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS-BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[42] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".

[43] 3GPP TS ~~08.06~~48.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[44] 3GPP TS ~~08.14~~48.014: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".

[45] 3GPP TS ~~08.16~~48.016: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS); Serving GPRS Support Node (SGSN) interface; Network Service".

[46] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[47] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)".

[48] ~~3GPP TS 12.00 (ETS 300 612-1): "Digital cellular telecommunications system (Phase 2+); Network Management (NM); Part 1: Objectives and structure of network management".~~[Void]

[49] [Void]~~3GPP TS 12.01 (ETS 300 612-2): "Digital cellular telecommunications system (Phase 2+); Network Management (NM); Part 2: Common aspects of GSM/DCS 1800 network management".~~

[50] [Void]~~3GPP TS 12.02: "Digital cellular telecommunications system (Phase 2+); Subscriber, Mobile Equipment (ME) and services data administration".~~

[51] [Void]~~3GPP TS 12.03: "Digital cellular telecommunications system (Phase 2+); Security management".~~

[52] [Void]~~3GPP TS 12.13: "Digital cellular telecommunications system (Phase 2+); Maintenance of the Mobile services Switching Centre (MSC)".~~

[53] [Void]~~3GPP TS 12.14: "Digital cellular telecommunications system (Phase 2+); Maintenance of location registers".~~

[54] [Void]~~3GPP TS 12.20: "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) Management Information".~~

[55] [Void] ~~3GPP TS 12.22: "Digital cellular telecommunications system (Phase 2+); Interworking of GSM Network Management (NM) procedures and messages at the Base Station Controller (BSC)".~~

[56] ITU-T Recommendations I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[57] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities".

[58] ITU-T Recommendation Q.702: "Signalling data link".

[59] ITU-T Recommendation Q.703: "Signalling link".

[60] ITU-T Recommendation Q.704: "Signalling network functions and messages".

[61] ITU-T Recommendation Q.711 (03/93): "Functional description of the signalling connection control part".

[62] ITU-T Recommendation Q.712 (03/93): "Definition and function of signalling connection control part messages".

[63] ITU-T Recommendation Q.713 (03/93): "Signalling connection control part formats and codes".

[64] ITU-T Recommendation Q.714 (03/93): "Signalling connection control part procedures".

[65] ANSI T1.111 (1996): "Signalling System No. 7 (SS7); Message Transfer Part".

[66] ANSI T1.112 (1996): "Signalling System No. 7 (SS7); Signalling Connection Control Part Functional Description".

3 Definitions, symbols and abbreviations

For the purposes of the present document the definitions, symbols and abbreviations given in 3GPP TR~~S 01.04~~21.905 and in 3GPP TS 23.060 apply.

5.2.1 Paging Initiation

When a VLR has to page a GPRS MS it shall check whether the MSC has an SCCP connection for that MS. If no SCCP connection exists the VLR checks the state of the association to an SGSN and the value of the restoration indicators for that MS. The VLR sends BSSAP+-PAGING-REQUEST messages to the SGSN if the state of the association for the MS is Gs-ASSOCIATED, LA-UPDATE-PRESENT or if the state of the association is Gs-NULL and the 'Confirmed by Radio Contact' restoration indicator is set to 'false'. The sending of the BSSAP+-PAGING-REQUEST message does not change the state of the association with the SGSN.

If the 'Confirmed by Radio Contact' restoration indicator is set to 'true', the VLR shall include the Location area identifier IE into the BSSAP+-PAGING-REQUEST message, otherwise (i.e. after a VLR failure) the Location area identifier IE shall not be included. When sending the BSSAP+-PAGING-REQUEST message, the VLR shall start timer T5.

If the state of the association is Gs-NULL and the restoration indicator 'Confirmed by Radio Contact' is set to 'false', the VLR shall also perform a search procedure as specified in 3GPP TS ~~03.18~~23.018.

5.3 Procedures in the SGSN

The SGSN accepts BSSAP+-PAGING-REQUEST messages in any state of the association apart from Gs-NULL. Nevertheless the SGSN also accepts BSSAP+-PAGING-REQUEST messages in the Gs-NULL state if the 'SGSN-Reset' restoration indicator at the SGSN is set to 'true'. When an SGSN receives a BSSAP+-PAGING-REQUEST message from a VLR, the SGSN shall first check if the MS is known by the SGSN. The handling of the paging request depends on the state of the association and the MM context variables at the SGSN:

a) The MS is known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'false':

- If the MS is considered to be IMSI attached for GPRS and non-GPRS services (i.e. the association is not in the state Gs-NULL), the SGSN shall page the MS based on the location information stored in the SGSN.

- If the MS is marked as IMSI detached for GPRS services or IMSI (implicitly or explicitly) detached for non-GPRS services (i.e. the state of the association is Gs-NULL), the SGSN shall return a BSSAP+-PAGING-REJECT message to that VLR indicating in the Gs Cause IE the detach circumstance ('IMSI detached for GPRS services', 'IMSI detached for non-GPRS services' or 'IMSI implicitly detached for non-GPRS services').

- If the MS is marked as unreachable (i.e. the PPF flag is set to 'false') the SGSN shall return a BSSAP+-MS-UNREACHABLE message to that VLR indicating in the Gs Cause IE 'MS unreachable'. The state of the association does not change at the SGSN.

b) The MS is known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'true':

- If the BSSAP+-PAGING-REQUEST message includes the Location area identifier IE, the SGSN shall page the MS in all the routeing areas served by the SGSN that are included in the location area indicated in the Location area identifier IE.

- If the BSSAP+-PAGING-REQUEST message does not include the Location area identifier IE, the SGSN may page in all the routeing areas served by the SGSN that are also served by the sending VLR.

c) The MS is not known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'false':

- The SGSN shall return a BSSAP+-PAGING-REJECT message to that VLR indicating in the Gs Cause IE 'IMSI unknown'.

d) The MS is not known and the restoration indicator 'SGSN-Reset' at the SGSN is set to 'true':

- If the VLR provides the Location area identifier IE, the SGSN shall page within the location area indicated by the VLR. Otherwise the SGSN may page in all the routeing areas served by the SGSN that are also served by the sending VLR.

If the SGSN accepts the paging request, the SGSN shall process the BSSAP+-PAGING-REQUEST message before sending the message on the Gb interface. The result of the processing on the BSSAP+-PAGING-REQUEST message is the PAGING CS message (see 3GPP TS ~~08.18~~48.018) sent on the Gb interface.

The SGSN shall not retransmit the PAGING CS message.

If within a location area there are cells that do not support GPRS services, the SGSN shall group these cells under a 'null RA'. The SGSN will perform the paging procedure described above within both the RA(s) derived from the location information and the 'null RA(s)' of the corresponding location area(s) (see 3GPP TS 24.008).

NOTE: The eMLPP priority information element relates to relative priorities within the paged MS and not to the priority in the sending of PAGING CS messages by the BSS.

14.1 General description

The MS Information procedure is used by the VLR to request specific parameters about the MS. If the target MS for an MS Information procedure or a Provide Subscriber Info procedure (see 3GPP TS ~~03.18~~23.018 and 3GPP TS 29.002) is GPRS attached (i.e. the state of the association to Gs-ASSOCIATED) the VLR may decide to perform the procedure via GPRS. The outcome of the MS Information procedure does not change the state of the association at the VLR or SGSN.

18.4 Information elements

18.4.1 Cell global identity

This information element uniquely identifies one cell.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3 to Octet 10	The rest of the information element is coded as the the value part of the cell global id IE defined in 3GPP TS ~~08.18~~48.018 (not including 3GPP TS ~~08.18~~48.018 IEI and 3GPP TS ~~08.18~~48.018 length indicator).							

Figure 18.4.1/3GPP TS 29.018: Cell global identity IE

18.4.2 Channel needed

The purpose of the *Channel Needed* information element is to indicate which type of channel is needed for the transaction linked to the paging procedure.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	The rest of the information element is coded as the IEI part and the value part of the Channel Needed IE defined in 3GPP TS ~~24.008~~44.018.							

Figure 18.4.2/3GPP TS 29.018: Channel needed IE

18.4.3 Downlink Tunnel Payload Control and Info

This information element is used to convey the payload of octets to be delivered to the identified mobile.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Spare	TOM Protocol Discriminator				E	Tunnel Priority	
Octet 4 to Octet n	Tunnel payload							

TOM Protocol Discriminator: Identifies the protocol using tunnelling of non-GSM signalling. For coding, see 3GPP TS ~~04.64~~44.064.

E: Cipher Request. When set to 1 indicates that the SGSN shall cipher the payload, when set to 0 indicates that the SGSN shall not cipher the payload.

Tunnel Priority: Indicates the priority of the Tunnel Payload. For coding, see table 20.1: Association between Tunnel Priority and LLC SAPs.

Figure 18.4.3/3GPP TS 29.018: Downlink Tunnel Payload Control and Info IE

18.4.4 eMLPP Priority

This element indicates the eMLPP-Priority.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	The rest of the information element is coded as the value part of the eMLPP-Priority IE defined in 3GPP TS ~~08.08~~48.008 (not including 3GPP TS ~~08.08~~48.008 IEI and 3GPP TS ~~08.08~~48.008 length indicator).							

Figure 18.4.4/3GPP TS 29.018: eMLPP Priority IE

18.4.7 Gs cause

The purpose of the value part of the Gs Cause information element is to indicate an error to the receiving entity. This could be a protocol data error or to indicate to the VLR the reason why a paging procedure could not be performed.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Gs Cause value							

Figure 18.4.7/3GPP TS 29.018: Gs Cause IE

Table 18.4.7/3GPP TS 29.018: Gs Cause IE value part

Gs Cause value (octet 3) Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	*Normal, unspecified* in this version of the protocol.
0 0 0 0 0 0 0 1	IMSI detached for GPRS services
0 0 0 0 0 0 1 0	IMSI detached for GPRS and non-GPRS services
0 0 0 0 0 0 1 1	IMSI unknown
0 0 0 0 0 1 0 0	IMSI detached for non-GPRS services
0 0 0 0 0 1 0 1	IMSI implicitly detached for non-GPRS services
0 0 0 0 0 1 1 0	MS unreachable
0 0 0 0 0 1 1 1	Message not compatible with the protocol state
0 0 0 0 1 0 0 0	Missing mandatory information element
0 0 0 0 1 0 0 1	Invalid mandatory information
0 0 0 0 1 0 1 0	Conditional IE error
0 0 0 0 1 0 1 1	Semantically incorrect message
0 0 0 0 1 1 0 0	Message unknown
0 0 0 0 1 1 0 1	Address error
0 0 0 0 1 1 1 0	TOM functionality not supported
0 0 0 0 1 1 1 1	Ciphering request cannot be accommodated
0 0 0 1 0 0 0 0 to 1 1 1 1 1 1 1 1	*Normal, unspecified* in this version of the protocol

NOTE: *'Normal, unspecified'* has the same meaning than in 3GPP TS 24.008, informative Annex H (~~GSM~~UMTS specific cause values for call control). It is used to report a normal event, and should not be interpreted as syntactically incorrect nor unknown if received.

18.4.14 Location area identifier

This element uniquely identifies one Location Area.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length Indicator							
Octet 3 - Octer 7	The rest of the information element is coded as the value part of the location area identifier IE defined in 3GPP TS ~~08.18~~48.018 (not including 3GPP TS ~~08.18~~48.018 IEI and 3GPP TS ~~08.18~~48.018 length indicator).							

Figure 18.4.14/3GPP TS 29.018: Location area identifier IE

18.4.25 Uplink Tunnel Payload Control and Info

This information element is used to convey the payload of octets received from the mobile to the appropriate non-GSM MSC/VLR.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Spare	TOM Protocol Discriminator				E	Tunnel Priority	
Octet 4 to Octet n	Tunnel payload							

TOM Protocol Discriminator: Identifies the protocol using tunnelling of non-GSM signalling. For coding, see 3GPP TS ~~04.64~~44.064.

E: Cipher Request. When set to 1 indicates that the SGSN received the payload in ciphered form, when set to 0 indicates that the SGSN did not receive the payload in ciphered form.

Tunnel Priority: Indicates the priority of the Tunnel Payload. For coding, see Table 20.1: Association between Tunnel Priority and LLC SAPs.

Figure 18.4.25/3GPP TS 29.018:Upnlink Tunnel Payload Control and Info IE

20.2 Procedures in the SGSN

A message received by the SGSN from an MS or sent by the SGSN to an MS on one of the Tunneling of Messages (TOM) LLC SAPs is called a *TOM Protocol Envelope* (see 3GPP TS ~~04.64~~44.064). The *TOM Protocol Envelope* is composed of the *TOM Protocol Header* immediately followed by a *Message Capsule*.

Upon receipt of a *TOM Protocol Envelope* with a *TOM Protocol Header* indicating the presence of one or more non-GSM signalling messages, the SGSN shall determine the non-GSM MSC/VLR to which the *Message Capsule* in the *TOM Protocol Envelope* shall be forwarded. The SGSN shall make this determination based upon the RAI of the MS, the *TOM Protocol Discriminator* field in the *TOM Protocol Header*, and *TOM Protocol Discriminator* specific information in the remaining octets (if any) in the *TOM Protocol Header*. The SGSN shall then forward a BSSAP+-UPLINK-TUNNEL-REQUEST message to the selected non-GSM MSC/VLR with the received *Message Capsule* in the *Tunnel Payload* field. The *Protocol Discriminator* field in the BSSAP+-UPLINK-TUNNEL-REQUEST message shall be set based on the *TOM Protocol Discriminator* in the *TOM Protocol Envelope*. *Tunnel Priority* field in the BSSAP+-UPLINK-TUNNEL-REQUEST message shall be set based on the LLC SAP on which the *TOM Protocol Envelope* was received. The *E* field shall be set to 1 if the *TOM Protocol Envelope* was received by the LLC in ciphered form, otherwise it shall be set to 0.

Upon receipt of a BSSAP+-DOWNLINK-TUNNEL-REQUEST message from a non-GSM MSC/VLR, the SGSN shall construct a *TOM Protocol Envelope* by mapping the *Tunnel Payload* field to the *Message Capsule* portion of the *TOM Protocol Envelope*. The *TOM Protocol Header* shall be constructed based on the *Protocol Discriminator* in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message. The SGSN shall then send the *TOM Protocol Envelope* to the MS on a specific LLC SAP. That LLC SAP shall be determined by the *Tunnel Priority* field in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message. LLC ciphering shall be enabled or disabled based upon the value of the *E* field in this message. If the SGSN is unable to send the *TOM Protocol Envelope* to the indicated MS for any reason, including the inability to accommodate the ciphering request as indicated in the BSSAP+-DOWNLINK-TUNNEL-REQUEST message, then it shall send a BSSAP+-MOBILE-STATUS message to the non-GSM MSC/VLR with an appropriate *Gs Cause* code.

The association between the LLC SAPs and the *Tunnel Priority* shall be as in the following table, where 00 is top-most priority and 11 is lowest priority.

Table 20.1: Association between Tunnel Priority and LLC SAPs

Tunnel Priority	LLC SAP
00	TOM2
01	Not defined
10	TOM8
11	Not defined

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021191

CR-Form-v5

CHANGE REQUEST

⌘ **44.001** **CR** **001** ⌘ **rev** **-** ⌘ Current version: **4.0.0** ⌘

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

Title:	⌘	Various clean-up of wrong references
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4
Date:	⌘	02.05.2002
Category:	⌘	**F**
Release:	⌘	Rel-4

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

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

Reason for change:	⌘	To list and make correct references before Rel-5 version is produced.
Summary of change:	⌘	Updated clause 2 with related references plus some editorials.
Consequences if not approved:	⌘	Wrong and insufficient references made.

Clauses affected:	⌘	
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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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.

0a.1 Scope

The present document describes the general aspects and principles relating to the Technical Specifications for the GSM MS-BSS interface.

0.20b References

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

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

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

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

[2] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)". GSM 02.30: "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[3] 3GPP TS 24.002: "GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration". GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[4] 3GPP TS 44.003 GSM 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".

[5] 3GPP TS 44.004 GSM 04.04: "Digital cellular telecommunications system (Phase 2+); lLayer 1; General requirements".

[6] 3GPP TS 44.005 GSM 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer; General aspects".

[7] 3GPP TS 44.006 GSM 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[8] 3GPP TS 24.007 GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".

[9] 3GPP TS 24.008 GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface; lLayer 3 specification; Core network protocols; Stage 3".

[10] 3GPP TS 24.010 GSM 04.10: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer- 3; Supplementary services specification; General aspects".

[11] 3GPP TS 24.011 GSM 04.11: "Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[12] 3GPP TS 44.012 GSM 04.12: "Digital cellular telecommunications system (Phase 2+); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[13] ~~CCITT~~ ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic Reference Model: The basic model~~Reference Model of Open Systems Interconnection for CCITT Applications~~".

[14] ITU-T~~CCITT~~ Recommendation X.210: "Information technology - Open systems interconnection - Basic Reference Model: Conventions for the definition of OSI services~~Open Systems Interconnection layer service definition conventions~~".

0~~.3~~c Definitons and abbreviations

Abbreviations used in the present document are listed in ~~GSM 01.04~~3GPP TR 21.905.

1 General

1.1

A GSM PLMN supports a wide range of services which a user accesses by a standard set of interfaces at a mobile station (MS). The mobile station is connected to the PLMN fixed infrastructure via a radio path to a base station, as shown in figure 1.

1.2

The MS-BSS interface on this radio path is specified in the ~~0~~24- and 44-series of Technical Specifications in such a way as to permit user and network technologies and configurations to evolve separately.

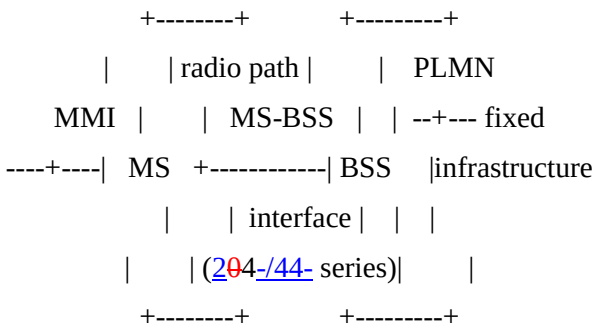

Figure 1: Basic interfaces for user access for a GSM PLMN

1.3

The principles and procedures for the man-machine interface (MMI) to the MS are described in Technical Specification ~~GSM 02.30~~3GPP TS 22.030. The user may also use standard terminal interfaces within the MS. The reference configuration for the access is described in Technical Specification ~~GSM 04.02~~3GPP TS 24.002.

6 Technical Specifications on GSM MS-BSS interfaces

6.1

The reference configurations for the GSM MS-BSS interface define the terminology for various reference points. Technical Specification ~~GSM 04.02~~3GPP TS 24.002 contains the GSM PLMN access reference configuration.

6.2

Technical Specification ~~GSM 04.03~~3GPP TS 44.003 defines the channel structures and access capabilities for the MS-BSS interface. A distinction is necessary between the logical channel structure supported by the interface and the access capability supported by the radio path of the system.

6.3

The MS-BSS interface as defined in Technical Specifications ~~GSM 04.04~~3GPP TS 44.004, 3GPP TS 44.005, 3GPP TS 44.006, 3GPP TS 24.007, 3GPP TS 24.008, 3GPP TS 24.010, 3GPP TS 24.011 and~~through~~ ~~04.12~~3GPP TS 44.012 is applicable to a wide range of situations.

7 Protocol modelling principles

7.1

The signalling protocols on the MS-BSS Interface are specified using the concepts of the reference model of Open System Interconection (OSI) given in ~~CCITT~~ ITU-T Recommendations X.200 and X.210.

7.3

For signalling on the MS-BSS interface three layers are required as shown in figure 4.

Figure 4: Layering on the MS-BSS interface

The layers are:

- PHYSICAL LAYER which corresponds to the lowest layer. The functions and protocols of the physical layer are defined in Technical Specification ~~GSM 04.04~~3GPP TS 44.004.
- DATA LINK LAYER. The functions and protocols of the data link layer are defined in Technical Specifications ~~GSM 04.05~~3GPP TS 44.005 and 3GPP TS 44.006~~04.06~~.
- LAYER 3. The functions and protocols of layer 3 are defined in Technical Specifications ~~GSM 04.07~~3GPP TS 24.007, ~~04.08~~3GPP TS 24.008, ~~04.10~~3GPP TS 24.010, ~~04.11~~3GPP TS 24.011 and ~~04.12~~3GPP TS 44.012.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021344

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CHANGE REQUEST

⌘ **44.013** **CR** **001** ⌘ **rev** **-** ⌘ Current version: **4.0.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Various clean-up of wrong references, eg towards 44.018
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4 ***Date:*** ⌘ 07.05.2002
Category:	⌘	**F** ***Release:*** ⌘ Rel-4

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2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	To list and make correct reference to 44.018 and other specifications, before promoting this spec to Rel-5.
Summary of change:	⌘	04.08 split to 44.018 is missing, and the transfer from GSM to 3GPP is completed., plus editorials.
Consequences if not approved:	⌘	Wrong and insufficient references made.

Clauses affected:	⌘	Majority.
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
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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.

Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies measurable performance requirements for signalling aspects of Mobile Stations (MS)s. To allow implementation flexibility it has been chosen to specify requirements on the whole Mobile Station rather than to specify requirements on each "OSI layer". As a consequence the performance requirements do not fit conveniently in specifications such as 3GPP TS 24.008 [4] and ~~GSM~~3GPP TS ~~04.08~~44.018 [4a] (layer 3 only) or ~~GSM~~3GPP TS ~~04.06~~44.006 [3] (layer 2 only).

The main aim of the present document is to provide the justification for testing of requirements that are not included in other GSM specifications. Where specific requirements are included in other GSM specifications they are not duplicated here.

MSs have to perform a wide variety of functions. As a consequence most performance measurements have to be made under a set of defined conditions: where necessary, these are included in the present document.

Where necessary certain assumptions are made about the interaction times between the mobile equipment and the SIM. If the (test) SIM does not respond within the assumed time then appropriate allowances shall be made.

Additionally, it is intended that the present document should contain sufficient requirements to enable some undefined network timers in 3GPP TS 24.008 [4] and ~~GSM~~3GPP TS ~~04.08~~44.018 [4a] to be calculated.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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

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

[2] ~~GSM~~3GPP TS ~~03.22~~43.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Functions related to Mobile Station (MS) in idle mode and ~~-~~group receive mode".

[3] ~~GSM~~3GPP TS ~~04.06~~44.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[4] ~~GSM~~3GPP TS ~~04.08~~24.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface; ~~I~~Layer 3 specification".

[4a] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[5] ~~GSM~~3GPP TS ~~04.86~~24.086: "~~Digital cellular telecommunications system (Phase 2+);~~ Advice of Charge (AoC) supplementary services; ~~–~~ Stage 3".

[6] ~~GSM~~3GPP TS ~~05.02~~45.002: ~~"Digital cellular telecommunications system (Phase 2+);~~ Multiplexing and multiple access on the radio path".

[7] ~~GSM~~3GPP TS ~~05.08~~45.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Radio subsystem link control".

3 Abbreviations and definitions

3.1 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1a] apply.

~~Abbreviations used in the present document are listed in GSM 01.04 [1].~~

3.2 Definitions

For the purposes of the present document, the following definition applies:

ready to transmit: in the present document the phrase "ready to transmit the message before time x" is defined to mean that the MS shall transmit part of that message no later than the first burst of the first TCH or control channel block that occurs after time x.

4 Default conditions

Unless otherwise stated, throughout the present document the following conditions are associated with the requirements:

- ideal radio link with an insignificant bit error rate;

- no other signalling is in progress on the main DCCH;
- messages sent by the network are correctly formed;
- the only established data link (or the only data link to be established) is on SAPI 0;
- any Starting Time IE that is included in a message sent by the network does not require the action to be delayed;
- cells are not barred and all access classes are allowed;
- the layer 2 performance of the network shall satisfy the "System Performance Requirements" of subclause 5.9 of ~~GSM~~3GPP TS ~~04.06~~44.006 [3];
- messages sent by the network may contain any set of optional IEs, and any permitted set of conditional IEs;
- the mobile has a valid SIM inserted, is powered on, and the SIM's update status is "updated"; and
- on the CCCH, the Page Mode IE is not set to "paging reorganization" or "same as before".

5 Requirements

5.1 General requirements

5.1.1 Response to layer 3 message

The requirements of subclause 5.1.1 apply if there are no specific requirements for a layer 3 message in other parts of clause 5.

If the last timeslot of the message block containing a network command occurs at time T, then the MS shall be ready to transmit the response before time T + 500 ms.

5.1.2 Response to an erroneous layer 3 message

If the last timeslot of the message block containing an erroneous RR, MM or CC message occurs at time T and if ~~GSM~~3GPP TS ~~04.08~~24.008 [4] and 3GPP TS 44.018 [4a] requires a status message to be returned to the network then the MS shall be ready to transmit the RR-STATUS or MM-STATUS or STATUS message before T + 500 ms.

5.2 Layer 3 Radio Resource signalling

5.2.0 Paging

If access to the network is allowed and the MS has been camped on a suitable cell for at least 2 s~~econds~~ and if the last timeslot of the message block containing a PAGING REQUEST message addressing the MS occurs at time T, then the MS shall be ready to transmit the CHANNEL REQUEST message before T + 0,7 s~~econds~~.

5.2.1 Paging and cell reselection after channel release

If the last timeslot of the message block containing a CHANNEL RELEASE message occurs at time T the MS shall respond to PAGING REQUEST messages sent later than T + 1,0 s~~econds~~.

5.2.2 Paging commands and immediate assignment rejection (Timer T3122)

If the last timeslot of the message block containing an IMMEDIATE ASSIGNMENT REJECT message is sent at time T and contains a Wait Indication of W seconds then the MS shall at least respond to PAGING REQUEST messages sent later than T + (W + 1) s~~econds~~.

5.2.3 Immediate assignment (Timer T3101)

If the last timeslot of the message block containing an IMMEDIATE ASSIGNMENT (or IMMEDIATE ASSIGNMENT EXTENDED) message is transmitted at time T then, the MS shall be ready to transmit the SABM frame with its information field before T + 25 ms. This requirement shall apply for assignment to TCH/F, TCH/H and SDCCH.

5.2.4 Channel assignment

If the last timeslot of the message block containing an ASSIGNMENT COMMAND occurs at time T, then the MS shall be ready to transmit the ASSIGNMENT COMPLETE message before T + 600 ms.

If the last timeslot of the message block containing an ASSIGNMENT COMMAND occurs at time T and this ASSIGNMENT COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the ASSIGNMENT FAILURE message on the old channel before T + 2 s~~econds~~.

If the last timeslot of the message block containing an ASSIGNMENT COMMAND occurs at time T and this ASSIGNMENT COMMAND is such that the MS shall not attempt to establish a layer 2 link on the new channel, then the MS shall be ready to transmit any ASSIGNMENT FAILURE message on the old channel before T + 500 ms.

5.2.5 Channel mode modify

If the last timeslot of the message block containing a CHANNEL MODE MODIFY message occurs at time T, then the MS shall be ready to transmit the CHANNEL MODE MODIFY ACKNOWLEDGE message before T + 300 ms. In the case that the call is a voice group or voice broadcast call the MS shall be ready to transmit the CHANNEL MODE ACKNOWLEDGE message before T + 50 ms.

5.2.6 Handover access

5.2.6.1 Finely, pseudo and pre synchronized cases

If the last timeslot of the message block containing a HANDOVER COMMAND message to a full rate TCH occurs at time T, then the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 650 ms.

If the last timeslot of the message block containing a HANDOVER COMMAND message to a half rate TCH occurs at time T, then the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 900 ms.

If the last timeslot of the message block containing a HANDOVER COMMAND message to an SDCCH occurs at time T, then the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 1,5 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to a full rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to

the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old full rate TCH before T + 2 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to a full rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old SDCCH before T + 2,5 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to a half rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old half rate TCH before T + 3 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to a half rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old SDCCH before T + 3 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to an SDCCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old SDCCH before T + 5 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND occurs at time T and this HANDOVER COMMAND is such that the MS shall not attempt to establish a layer 2 link on the new channel, then the MS shall be ready to transmit any HANDOVER FAILURE message on the old channel before T + 500 ms.

5.2.6.2 Non synchronized case

If the last timeslot of the message block containing the (one and only) PHYSICAL INFORMATION message occurs at time T, then on a full rate TCH the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 500 ms.

If the last timeslot of the message block containing the (one and only) PHYSICAL INFORMATION message occurs at time T, then on a half rate TCH the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 750 ms.

If the last timeslot of the message block containing the (one and only) PHYSICAL INFORMATION message occurs at time T, then on an SDCCH the MS shall be ready to transmit the HANDOVER COMPLETE message before T + 1,5 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to either a full rate or a half rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old TCH before T + 1,1 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to an SDCCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old SDCCH before T + 2 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND to either a full rate or a half rate TCH occurs at time T and this HANDOVER COMMAND is such that the MS tries but fails to establish a layer 2 link on the new channel and thus reverts to the old channel, then the MS shall be ready to transmit the HANDOVER FAILURE message on the old SDCCH before T + 1,7 s~~econds~~.

If the last timeslot of the message block containing a HANDOVER COMMAND occurs at time T and this HANDOVER COMMAND is such that the MS shall not attempt to establish a layer 2 link on the new channel, then the MS shall be ready to transmit any HANDOVER FAILURE message on the old channel before T + 500 ms.

5.2.7 Encryption

If the last timeslot of the message block containing a CIPHERING MODE COMMAND message occurs at time T, then the MS shall be ready to transmit the CIPHERING MODE COMPLETE message before T + 500 ms.

5.2.8 Classmark change

While the MS has an active RR connection, any change in the MS's capabilities that are indicated in the Mobile Station Classmark 2 or 3 IEs shall cause a CLASSMARK CHANGE message to be sent to the network. The MS shall be ready to transmit the CLASSMARK CHANGE message not later than 1 second after the change in capabilities.

5.2.9 Classmark interrogation

If the last timeslot of the message block containing a CLASSMARK ENQUIRY message occurs at time T, then the MS shall be ready to transmit the CLASSMARK CHANGE message before T + 300 ms.

5.2.10 Release (Timer T3110)

If the last timeslot of the message block carrying the CHANNEL RELEASE message occurs at time T, then the MS shall cease transmissions on all channels before T + 500 ms.

5.2.11 Early sending of the CLASSMARK CHANGE message

During a contention resolution procedure, if the last timeslot of the block containing a Layer 2 UA frame, occurs at time T, then the MS shall be ready to transmit the CLASSMARK CHANGE message, if applicable (see ~~GSM~~3GPP TS ~~04.06~~44.006 [3] and ~~GSM~~3GPP TS ~~04.08~~44.018 [4a]), before T + 40 ms.

5.3 Layer 3 Mobility Management signalling

5.3.1 Periodic location updating timer

When the T3212 time-out value is set to the non-zero value P and the last timeslot of the message block containing a CHANNEL RELEASE message is transmitted at time T then, assuming the next event shall be the periodic location update, the next CHANNEL REQUEST message shall be transmitted between time T + P decihours - 15 seconds and time T + P decihours + 15 s~~econds~~.

5.3.2 Identification

If the last timeslot of the message block containing an IDENTITY REQUEST message occurs at time T, then the MS shall be ready to transmit the IDENTITY RESPONSE message before T + 600 ms. This requirement assumes that the ME has to wait less than 100 ms to obtain any necessary responses from the SIM.

5.3.3 Authentication

If the last timeslot of the message block containing an AUTHENTICATION REQUEST message occurs at time T, then the MS shall be ready to transmit the AUTHENTICATION RESPONSE message before T + 1 s~~econd~~. This requirement assumes that the ME has to wait less than 500 ms to obtain any necessary responses from the SIM.

5.3.4 T3240 expiry

If the last timeslot of the message block containing an AUTHENTICATION REJECT message; or a LOCATION UPDATING ACCEPT message (without a Follow On Proceed IE); or a LOCATION UPDATING REJECT message; or a CM SERVICE REJECT message (and no other MM connection is active) occurs at time T, and the network does not send a CHANNEL RELEASE message but does maintain the RR connection, then the MS shall cease transmission on all channels before T + 12 s~~econds~~.

5.3.5 TMSI reallocation

If the last timeslot of the message block containing either a TMSI REALLOCATION COMMAND, or a LOCATION UPDATING ACCEPT with a TMSI in the Mobile Identity IE, occurs at time T, then the MS shall be ready to transmit the TMSI REALLOCATION COMPLETE message before T + 500 ms.

5.3.6 IMSI detach

The requirements of this subclause only apply if the network indicates on the BCCH that IMSI detach shall be used.

If it is possible to switch the mobile off, or if it is possible to remove the SIM whilst the mobile is powered on, then when such an action is performed in idle mode at time T, the first CHANNEL REQUEST message for the IMSI Detach procedure shall be transmitted before T + 2 s~~econds~~.

If it is possible to switch the mobile off, or if it is possible to remove the SIM whilst the mobile is powered on, then when such an action is performed in the Active (U10) state of a call at time T, the MS shall be ready to transmit the IMSI DETACH INDICATION message before T + 1 s~~econd~~.

If the last timeslot in which the IMSI DETACH message is sent occurs at time T then the MS shall cease transmission on all channels before T + 6 s~~econds~~.

5.3.7 Location updating with random access failure

In an environment with only one suitable cell (see ~~GSM~~3GPP TS ~~03.22~~43.022 [2] for the definition of a "suitable cell"), if a location updating attempt suffers a random access failure (see ~~GSM~~3GPP TS ~~04.08~~44.018 [4a]) with the last CHANNEL REQUEST message being transmitted at time T, then the first re-attempt shall result in a CHANNEL REQUEST message being transmitted before T + 15 s~~econds~~.

5.3.8 Follow on call

If the last timeslot of the message block containing a LOCATION UPDATING ACCEPT message with a Follow on Proceed IE occurs at time T and the MS has a CM application request pending, then the MS shall be ready to the CM SERVICE REQUEST message before T + 500 ms.

5.4 Layer 3 Call Control signalling

5.4.1 Time to send SETUP message

In the case of a MS originated call, if the last timeslot of the message block containing a CM SERVICE ACCEPT message occurs at time T then the MS shall be ready to transmit the SETUP message before T + 500 ms. In the case that the call is a voice group or voice broadcast call the MS shall be ready to transmit the SETUP message before T + 50 ms.

In the case of a MS originated call, if the last timeslot of the message block containing a CIPHERING MODE COMMAND message occurs at time T, then the MS shall be ready to transmit the SETUP message before T + 750 ms. In the case that the call is a voice group or voice broadcast call the MS shall be ready to transmit the SETUP message before T + 50 ms.

In the case of a MS originated call, if the last timeslot of the message block containing a MM GO ON message occurs at time T, then the MS shall be ready to transmit the SETUP message before T + 50 ms. In the case that the call is a voice group or voice broadcast call the MS shall be ready to transmit the SETUP message before T + 50 ms.

5.4.2 Response times to CC messages

For the commands and responses listed in table 1, the following shall apply:

- if the last timeslot of the message block in which the "command" message is sent occurs at time T, then the MS shall be ready to transmit any one of the possible "responses" before time T + W.

In table 1, the second figure, where provided, represents the time that must be achieved in the case of a voice group or voice broadcast call.

Table 1: Call Control message response times

command (network --> MS)	response(s) (MS --> network)	W
CONNECT	CONNECT ACKNOWLEDGE	500 ms, 50 ms
SETUP	(as first response message) CALL CONFIRMED or ALERTING or CONNECT or RELEASE COMPLETE	1 s~~econd~~, 50 ms
SETUP	(as second response message) ALERTING or CONNECT or DISCONNECT	2 s~~econds~~
SETUP	(as third response message) CONNECT	no requirement

DISCONNECT	RELEASE	500 ms
RELEASE	RELEASE COMPLETE	500 ms
STATUS ENQUIRY	STATUS	500 ms

5.4.3 User alerting

If the MS has some form of user alerting and if for a mobile terminating call the MS sends the ALERTING message before the CONNECT message then:

- if the last timeslot carrying a SETUP message containing the Signal IE occurs at time T, the user alerting shall be initiated before time T + 1 s~~econd~~.

5.4.4 Call establishment

If the MS's service indication indicates that service is available (see ~~GSM~~3GPP TS ~~03.22~~43.022 [2]) and after the entry of suitable number digits, then if the "SEND" or "Emergency SEND" function on the MS is activated at time T, the first CHANNEL REQUEST message shall be transmitted before time T + 2 s~~econd~~.

5.4.5 Call reestablishment

The requirement of this subclause relates to the following environment and conditions:

- the MS is the active (U10) state of a speech call on cell A;
- the NCC of cell B is indicated as permitted in the SYSTEM INFORMATION messages of cell A, but cell B may be in a different location area;
- cells A and B are the only cells which have C1 > 0 (see ~~GSM~~3GPP TS ~~05.08~~45.008 [7]);
- cell B is in at least the BA(SACCH) list of cell A;
- cell B allows call reestablishment.

If the transmissions from cell A are disrupted such that the MS shall detect a radio link failure at time T then the MS shall transmit a CHANNEL REQUEST message to cell B before time T + 3 s~~econd~~.

5.4.6 In call modification

For network originated in call modification, if the MS transmits the last timeslot of the message block containing the MODIFY message at time T then the MS shall be ready to transmit the MODIFY COMPLETE message before time T + 500 ms.

5.4.7 DTMF

This requirement applies when the MS's DTMF function is not disabled.

When the first number key is pressed on the MS during the Active (U10) state of a call at time T, then the MS shall be ready to transmit the START DTMF message before time T + 500 ms.

5.5 Supplementary service signalling

5.5.1 Advice of Charge Charging (AoCC)

The following requirements only apply to mobile stations that support the Advice of Charge Charging supplementary service defined in ~~GSM~~3GPP TS ~~04.86~~24.086 [5].

If the last timeslot of the message block in which a Call Control message with a Facility information element containing the operation ForwardChargeAdvice with the SS code set to AoCC occurs at time T, then the MS shall be ready to transmit a message with a Facility information element containing a Return result with the same Invoke ID before time T + 1 s~~econd~~.

5.6 Short Message Services Point-to-Point

These requirements relate to signalling using SAPI 3.

5.6.1 CP-DATA

If the last timeslot of the message block containing a CP-DATA message occurs at time T, then the MS shall be ready to transmit the CP-ACK message before T + 500 ms.

5.6.2 RP-DATA

If the last timeslot of the message block containing a RP-DATA message which will be stored in the ME and for which the ME has storage room available occurs at time T, then the MS shall be ready to transmit the RP-ACK message before time T + 1 s~~econd~~.

If the last timeslot of the message block containing a RP-DATA message whose destination is the SIM and for which the SIM has storage room available occurs at time T, then the ME shall start to send the short message on the ME - SIM interface before time T + 250 ms.

If the last timeslot of the message block containing a RP-DATA message whose destination is the TE occurs at time T, then the ME shall start to send the short message on the ME - TE interface before time T + 250 ms.

In the case of a short message supplied to the SIM, if the response from the SIM that triggers the sending of the RP-ACK message is completed on the SIM-ME interface at time T, then the MS shall be ready to transmit the RP-ACK message before time T + 250 ms.

In the case of a short message supplied to the TE, if the response from the TE that triggers the sending of the RP-ACK message is completed on the TE-ME interface at time T, then the MS shall be ready to transmit the RP-ACK message before time T + 250 ms.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

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CR-Form-v5

CHANGE REQUEST

⌘ **44.068** **CR** **003** ⌘ **rev** **1** ⌘ Current version: **4.2.0** ⌘

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

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Various clean-up of wrong references, eg towards 44.018
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4 ***Date:*** ⌘ 14.05.2002
Category:	⌘	**F** ***Release:*** ⌘ Rel-4

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	To list and make correct reference to 44.018 and many other specifications, before promoting this spec to Rel-5.
Summary of change:	⌘	04.08 split to 44.018 is missing, and the transfer from GSM to 3GPP is completed.
Consequences if not approved:	⌘	Wrong and insufficient references made.

Clauses affected:	⌘	2, 3.1, 3.2, 5, 6.2.2, 6.2.2.2, 7.5, 8, 8.2, 8.3, 8.3a, 9.4.3
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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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.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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[1] ~~3GPP TS TR 01.04: "3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Abbreviations and acronyms".~~Void

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

[2] 3GPP TS 42.068: "~~3rd Generation Partnership Project; Technical Specification Group Services and system Aspects;~~ Voice Group Call Service (VGCS); ~~s~~Stage 1".

[3] 3GPP TS 23.003: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Numbering, addressing and identification".

[4] 3GPP TS 23.067: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~"enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2".

[5] 3GPP TS 43.068: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~Voice Group Call Service (VGCS); Stage 2".

[6] 3GPP TS 44.006~~GSM 04.06~~: " Mobile Station - Base Stations System (MS - BSS) Interface; Data Link (DL) Layer Specification ~~3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification~~".

[7] 3GPP TS 24.007: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Mobile radio interface signalling layer 3; General aspects".

[8] 3GPP TS 44.018~~GSM 04.08~~: " Mobile radio interface layer 3 specification; Radio Resource Control Protocol~~3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Mobile radio interface layer 3 specification~~".

[9] 3GPP TS 24.008: " Mobile radio interface Layer 3 specification; Core network protocols; Stage 3~~3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Mobile Radio Interface~~".

3 Definitions and abbreviations

3.1 Definitions

~~Definitions used in the present document are also defined in 3GPP TS 42.068.~~

For the purposes of the present document the terms and definitions given in 3GPP TS 42.068 and the following ~~terms and definitions~~ apply:

attachment of the user connection: S~~s~~ee ~~GSM 04.08~~3GPP TS 24.008, subclause 5.2.

calling user: GCC entity in the Mobile Station (MS) initiating or having initiated a group call.

clearing the context related to the group call establishment: all running GCC timers in the relevant GCC entity are stopped, all attributes in the relevant GCC entity are deleted.

downlink: network to mobile station direction.

group call: is used in the same sense as "voice group call".

group call channel: combined uplink/downlink to be allocated in each cell of the group call area for a particular group call. The uplink can be used by the presently talking service subscriber only. All MSs of the listening service subscribers in one cell shall listen to the common downlink.

group receive mode: S~~s~~ee ~~GSM 04.08~~3GPP TS 44.018.

originating mobile station: mobile station initiating or having initiated the group call.

~~(~~NOTE 1~~ote that, :~~ I~~i~~n certain situations, a MS assumes to be the originating MS of a group call without actually being the originating MS of that group call.

~~-~~NOTE 2~~ote that :~~ T~~t~~here may be one or none originating MS for a given group call~~)~~.

uplink: mobile station to network direction.

3.2 Abbreviations

~~Abbreviations used in the present document are also listed in 3GPP TS TR 01.04.~~

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1a] and the following ~~abbreviations~~ apply:

BSS	Base Station System
eMLPP	enhanced Multi-Level Precedence and Pre-emption service
GCC	Group Call Control
	GPRS General Packet Radio Service
MS	Mobile Station
VGCS	Voice Group Call Service
CM	Connection Management
TI	Transaction Identifier

5 Main concepts

The present document describes the group call control (GCC) protocol, which is one of the protocols of the Connection Management (CM) sublayer (see 3GPP TS 24.007).

There is in general more than one MS engaged in a group call. Consequently, there is in general more than one MS with a GCC entity engaged in the same group call, and there is one GCC entity in the network engaged in that group call.

Under which conditions a GCC message is passed from lower (sub-)layers to the GCC entity is defined in the specifications of the sub-layers.

The MS shall ignore GCC messages that it receives which were sent in unacknowledged mode and which explicitly specify as destination a mobile identity which is not a mobile identity of the MS.

Higher layers and the MM sub-layer decide when to accept parallel GCC transactions and when/whether to accept GCC transactions in parallel to other CM transactions.

The group call may be initiated by a mobile user or by a dispatcher. Specification of a protocol for dispatchers is out of the scope of the present document. Hence, in the scope of the present document, there are:

- one GCC entity in the network; and
- one or more than one GCC entities in different MSs;

engaged in a group call, and one ore none of the MSs is the originator of the group call (called the originating MS in the present document). Note that, in certain situations, a MS assumes to be the originator of a group call without being the originator.

The originator of the GCC transaction chooses the Transaction Identifier (TI). A MS not assuming to be the originator of the transaction will chose the transaction identifier received from the network, setting the TI flag to 1+x mod 2 where x is the received TI flag.

The present document describes the group call control protocol only with regard to two peer entities, one in a MS, the other one in the network. The call control entities are described as communicating finite state machines which exchange messages across the radio interface and communicate internally with other protocol (sub)layers. In particular, the GCC protocol uses the MM and RR sublayer specified in ~~GSM 04.08~~3GPP TS 24.008 and 3GPP TS 44.018. This description in only normative as far as the consequential externally observable behaviour is concerned. For simplicity, instead of using the terms "GCC entity in the MS" and "GCC entity in the network", the present document often uses the terms "MS" and "network" if no confusion may arise.

Certain sequences of actions of the two peer entities compose "elementary procedures" which are used as a basis for the description in the present document. These elementary procedures are defined in clause 6.

The network should apply supervisory functions to verify that the GCC procedures are progressing and if not, take appropriate means to resolve the problems. This, however, is out of the scope of the present document.

6.2.2 Mobile originated establishment

Higher layers in the MS may ask the GCC entity in state U0, NULL, to establish a group call, either using the immediate set-up procedure or using the set-up procedure. The request contains a group-id and may contain a priority indication.

On request of higher layers to establish a group call using the set-up procedure, the GCC entity of the MS builds an appropriate SETUP message and asks lower (sub-)layers to establish an MM connection explicitly (i.e. by use of a CM SERVICE REQUEST message) and to transmit the SETUP message. It then enters state U0.p, MM CONNECTION PENDING. In state U0.p, when informed by lower sub-layers that an MM connection has been established, the GCC entity in the MS shall stop timer $T_{MM\text{-}est}$ and enter state U1, GC INITIATED.

On request of higher layers to establish a group call using the immediate set-up procedure, the GCC entity of the MS builds an appropriate IMMEDIATE SETUP message and asks lower (sub-)layers to establish an MM connection implicitly (see ~~GSM 04.08~~3GPP TS 24.008) and to transmit the IMMEDIATE SETUP message. It sets timer $T_{MM\text{-}est}$ and then enters state U1, GC INITIATED.

The network GCC entity in state NULL may receive a set-up message from its peer entity in the originating MS. This set-up message is either a SETUP message or an IMMEDIATE SETUP message. The network enters state N1, GC INITIATED.

In state N1, the network decides whether:

(a) the establishment is accepted; or

(b) the establishment rejected; or

(c) the MS is passed to an existing group call.

In case (a), the GCC entity in the network considers the peer entity in the MS having sent the set-up message to be the calling user and asks lower layers to activate the appropriate resources. It then:

1) waits until it is informed by lower (sub-)layers that resource activation was sufficiently successful, then sends a CONNECT message to the calling user, and enters state N2, GC ACTIVE; or

2) sends a CONNECT message to the calling user and enters N3, GC ESTABLISHMENT PROCEEDING. In state N3, the GCC entity is informed by lower layers whenever the status of resources for the group call is changed. When informed that activation of resources was sufficiently successful, the GCC entity in the network enters state N2, ACTIVE.

The CONNECT message specifies the group call reference of the group call and indicates that the MS is the originator of the group call.

In case b), the further proceeding is as defined in subclause 6.2.2.1.

In case c), the GCC entity in the network considers the peer entity in the MS having sent the SETUP message not to be the calling user; it may ask lower layers about the status of appropriate resources; it may ask lower layers to modify the resources for the group call. It then:

1) waits until it is informed by lower (sub-)layers that resource modification was sufficiently successful, then sends a CONNECT message to the calling user, and enters state N2, GC ACTIVE; or

2) sends a CONNECT message to the calling user and enters N3, GC ESTABLISHMENT PROCEEDING. In state N3, the GCC entity is informed by lower layers whenever the status of resources for the group call is changed. When informed that activation of resources was sufficiently successful, the GCC entity in the network enters state N2, ACTIVE.

The CONNECT message specifies the group call reference of the group call and indicates that the MS is not the originator of the group call.

In state U0.p or U1, the GCC entity in the MS shall, on receipt of a CONNECT message, establish the conditions defined for state U2, ACTIVE and the suitable sub-state (see subclause 6.1.2.1), stop timer $T_{MM\text{-}est}$ (if running) and enter state U2, ACTIVE. If the immediate set-up procedure has been used, the GCC entity in the MS shall inform lower sub-layers that the MM connection has been implicitly established.

6.2.2.1 Termination during mobile originated establishment

At any time during the mobile originated establishment of a group call, the network may decide to terminate the connection between the two peer entities in the network and MS. In this case the network sends a TERMINATION message to the MS specifying the appropriate cause; it may ask lower (sub-)layers to release associated resources. The further actions are specified in subclause 6.4.

During mobile originated establishment of a group call, the MS may abort the group call, see subclause 6.4.

6.2.2.2 Abnormal cases

At expiry of $T_{MM\text{-}est}$, or radio link failure (see 3GPP TS 44.018~~GSM 04.08~~), the GCC entity in the MS requests lower sub-layers to abort the MM connection establishment and returns to state U0, NULL(this includes clearing of the context related to the group call establishment).

On receipt of an indication of lower sub-layers that the MM connection establishment was unsuccessful, the GCC entity in the MS returns to state U0, NULL (this includes clearing of the context related to the group call establishment).

7.5 Non-semantical mandatory information element errors

When on receipt of a message;

- an "imperative message part" error; or
- a "missing mandatory IE" error;

is diagnosed or when a message containing;

- a syntactically incorrect mandatory IE; or
- an IE unknown in the message, but encoded as "comprehension required" (see ~~GSM 04.08~~3GPP TS 24.008, subclause 10.5); or
- an out of sequence IE encoded as "comprehension required" (see ~~GSM 04.08~~3GPP TS 24.008, subclause 10.5);

is received;

- the MS shall, if COMM = F, ignore the message. Otherwise it shall proceed as follows:
  - the MS shall ignore the message except for the fact that it shall return a STATUS message with cause "invalid mandatory information" and including, if possible, as diagnostics the complete message received (this may not be possible, e.g., due to length restrictions).

8 Message functional definitions and contents

This subclause defines the structure of the messages of those layer 3 protocols defined in the present document, that is the GCC protocol.

All messages are standard L3 messages as defined in 3GPP TS 24.007.

Each definition given in the present subclause includes:

- a brief description of the message direction and use;
- a definition in which direction the message is defined;
- a table listing the information elements permitted to be in that message and their order of their appearance in the message. All information elements that may be repeated are explicitly indicated. Neither the network nor the MS is allowed to include information elements in a message which are not specified for the message or to include the information elements in the message in an order different from the specified order. (V and LV formatted IEs, which compose the imperative part of the message, occur before T, TV, and TLV formatted IEs which compose the non-imperative part of the message, cf. 3GPP TS 24.007.) In a (maximal) sequence of consecutive information elements with half octet length, the first information element with half octet length occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N+1 etc. Such a sequence always has an even number of elements.

  For each information element the table indicates:

  1) if the IE has format T, TV, or TLV, the IEI used by the IE at the indicated position in the message, in hexadecimal notation. If the IEI has half octet length, this is specified by a notation representing the IEI as a hexadecimal digit followed by a "-" (example: B-);
  2) the name of the information element (which may give an idea of the semantics of the element). The name of the information element (usually written in italics) followed by "IE" or "information element" is used in ~~GSM 04.08~~3GPP TS 24.008 as reference to the information element within a message;
  3) the name of the type of the information element (which indicates the coding of the value part of the IE), and generally, the referenced subclause of clause 9 describing the value part of the information element;
  4) the presence requirement indication (M or O) for the IE as defined in 3GPP TS 24.007 (Presence requirement indication C is not used in the present document);

5) the format of the information element (T, V, TV, LV, TLV) as defined in 3GPP TS 24.007;

6) the length of the information element (or permissible range of lengths), in octets, in the message. This indication is normative. However, further restrictions to the length of an IE may be specified elsewhere.

subclauses specifying, where appropriate;

- the meaning of; and

- conditions for;

absence, repeated occurrence, and/or presence for IEs with presence requirement O in the relevant message which together with other conditions specified in the present document define when the information elements shall be included or not, what presence, repeated occurrence, and absence of such IEs means.

8.2 GET STATUS

This message is sent by the network at any time to solicit a STATUS message from the MS in acknowledged or unacknowledged mode.

See table 8.2.

Message type: GET STATUS;

Significance: local;

Direction: network to MS.

Table 8.2: GET STATUS message content

IEI	Information element	Type / Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
17	mobile identity	mobile identity ~~GSM 04.08~~3GPP TS 24.008, 10.5.1.4	O	TLV	3-10

8.2.1 mobile identity

This IE is included if the network wishes so. If the message is received by the MS in acknowledged mode, it shall be ignored by the MS. If received in unacknowledged mode, it specifies the destination MS, see clause 5.

8.3 IMMEDIATE SETUP

This message is sent by the MS to the network in order to set-up a group call immediately, i.e. without previous establishment of an MM connection. See table 8.3.

Message type: IMMEDIATE SETUP;

Significance: dual;

Direction: MS to network.

Table 8.3: IMMEDIATE SETUP message content

IEI	Information element	Type / Reference	Presence	Format	Length
	protocol discriminator	protocol discriminator 9.1	M	V	1/2
	transaction identifier	transaction identifier 9.2	M	V	1/2
	message type	message type 9.3	M	V	1
	Spare half octet	Spare half octet 9.4.6	M	V	1/2
	Ciphering key sequence number	Ciphering key sequence number ~~GSM 04.083~~GPP TS 24.008, 10.5.1.2	M	V	1/2
	Mobile station classmark	Mobile station classmark 2 ~~GSM 04.083~~GPP TS 24.008, 10.5.1.6	M	LV	4
	Mobile identity	Mobile identity ~~GSM 04.083~~GPP TS 24.008, 10.5.1.4	M	LV	2-9
	Group identity	Call reference 9.4.1	M	V	4

8.3.1 Mobile identity

This IE shall specify the TMSI, if available, and the IMSI else.

8.3a IMMEDIATE SETUP 2

This message is sent by the MS to the network in order to set-up a group call immediately, i.e. without previous establishment of an MM connection, and to include compressed originator-to dispatcher information. The message shall only be used if the MS has a valid TMSI. See table 8.3a.

Message type: IMMEDIATE SETUP 2;

Significance: dual

Direction: MS to network.

Table 8.3a: IMMEDIATE SETUP 2 message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 9.1	M	V	½
	Transaction identifier	Transaction identifier 9.2	M	V	½
	Message type	Message type 9.3	M	V	1
	Spare half octet	Spare half octet 9.4.6	M	V	½
	Ciphering key sequence number	Ciphering key sequence number ~~GSM 04.083~~GPP TS 24.008, 10.5.1.2	M	V	½
	Mobile station classmark	Mobile station classmark 2 ~~GSM 04.083~~GPP TS 24.008, 10.5.1.6	M	LV	4
	TMSI	TMSI/P-TMSI 3GPP TS ~~24.008~~44.018, 10.5.2.42	M	V	4
	Group identity	Call reference 9.4.1	M	V	4
	Compressed otdi	Compressed otdi 9.4.8	M	V	5

8.3a.1 TMSI

The *TMSI* information element indicates the Temporary Mobile Subscriber Identity of the MS.

8.3a.2 Compressed otdi

This information element contains compressed originator-to-dispatcher information.

9.4.3 Cause

The purpose of the *cause* information element is to describe the reason for generating certain messages and to provide diagnostic information in the event of procedural errors.

The *cause* information element is a type 4 information element. Its value part has a minimal length of 1 octet. The maximum length is given by the maximum number of octets in a L3 message (see ~~GSM 04.06~~3GPP TS 44.006).

The value part is coded as shown below:

<*cause* > ::= **1 cause_part** [**diagnostics** *]*

| **0 cause_part** <*cause*>

Attributes

The **cause_part** field defines a non-negative integer N. If more than one **cause_part** fields are present in <*cause*>, the information element indicates an unspecific cause; otherwise, it indicates a cause as defined by N.

Field contents

The fields of the information element are coded as shown in table 9.4.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

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CR-Form-v5

CHANGE REQUEST

⌘ **44.069** **CR** **003** ⌘ **rev** **1** ⌘ Current version: **4.2.0** ⌘

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

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Various clean-up of wrong references, eg towards 44.018
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI4 ***Date:*** ⌘ 14.05.2002
Category:	⌘	**F** ***Release:*** ⌘ Rel-4

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

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

Reason for change:	⌘	To make correct reference to 44.018 and other specifications, before promoting this spec to Rel-5.
Summary of change:	⌘	44.018 is wrongly refered, and the transfer from GSM to 3GPP is completed.
Consequences if not approved:	⌘	Wrong and insufficient references made.

Clauses affected:	⌘	2, 3.1, 3.2, 6.2.2, 6.3.3, 8.3a, 9.4.3
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

2 References

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

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

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

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

[2] 3GPP TS 42.069: "~~3rd Generation Partnership Project; Technical Specification Group Services and system Aspects;~~ Voice Broadcast Service (VBS); ~~–~~ Stage 1".

[3] 3GPP TS 23.003: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Numbering, addressing and identification".

[4] 3GPP TS 23.067: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ enhanced Multi-Level Precedence and Pre-emption service (eMLPP); ~~–~~ Stage 2".

[5] 3GPP TS 43.069: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Voice Broadcast Call Service (VBCS); ~~s~~Stage 2".

[6] 3GPP TS 44.006~~GSM 04.06~~: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface; ~~-~~Data Link (DL) layer specification".

[7] 3GPP TS 24.007: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Mobile radio interface signalling layer 3; General aspects".

[8] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3~~3rd Generation Partnership Project; Technical Specification Group Core Network; Mobile radio interface layer 3 specification~~".

[9] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol~~3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; Mobile Radio Interface - Layer 3 Specification RR part~~".

[10] 3GPP TS 44.068: "~~3rd Generation Partnership Project; Technical Specification Group Core Network;~~ Group Call Control (GCC) protocol".

3 Definitions and abbreviations

3.1 Definitions

~~Definitions used in the present document are also defined in 3GPP TS 42.069.~~

For the purposes of the present document, the ~~following~~ terms and definitions defined in 3GPP TS 42.069 and the following apply:

Attachment of the user connection: S~~s~~ee 3GPP TS 24.008, subclause 5.2.

Broadcast call channel: downlink channel to be allocated in each cell of the group call area for a particular broadcast call. All MSs of the listening service subscribers in one cell shall listen to the common downlink.

Broadcast call: is used in the same sense as "voice broadcast call".

Calling user: BCC entity in the Mobile Station (MS) initiating or having initiated a broadcast call.

Clearing the context related to the broadcast call establishment: all running BCC timers in the relevant BCC entity are stopped, all attributes in the relevant BCC entity are deleted.

Downlink: network to MS direction.

Group receive mode: ~~s~~See 3GPP TS ~~24.008~~44.018.

Originating mobile station: MS initiating or having initiated the broadcast call.

Uplink: Mobile station to network direction.

3.2 Abbreviations

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

For the purposes of the present document, the ~~following~~ abbreviation defined in 3GPP TR 21.905 [1a] and the following applies:

BCC Broadcast Call Control

6.2.2 Mobile originated establishment

Higher layers in the MS may ask the BCC entity in state U0, NULL, to establish a broadcast call, either using the immediate set-up procedure or using the set-up procedure. The request contains a group-id and may contain a priority indication.

On request of higher layers to establish a broadcast call using the set-up procedure, the BCC entity of the MS builds an appropriate SETUP message and asks lower (sub-)layers to establish an MM connection explicitly (i.e. by use of a CM SERVICE REQUEST message) and to transmit the SETUP message. It then enters state U0.p, MM CONNECTION PENDING. In state U0.p, when informed by lower sub-layers that an MM connection has been established, the BCC entity in the MS shall stop timer $T_{MM\text{-}est}$ and enter state U1, BC INITIATED.

On request of higher layers to establish a broadcast call using the immediate set-up procedure, the BCC entity of the MS builds an appropriate IMMEDIATE SETUP message and asks lower (sub-)layers to establish an MM connection implicitly (see 3GPP TS 24.008) and to transmit the IMMEDIATE SETUP message. It sets timer $T_{MM\text{-}est}$ and then enters state U1, BC INITIATED.

The network BCC entity in state NULL may receive a set-up message from its peer entity in the originating MS. This set-up message is either a SETUP message or an IMMEDIATE SETUP message. The network enters state N1, BC INITIATED.

In state N1, the network decides whether:

a) the establishment is accepted; or

b) the establishment rejected.

In case a), the BCC entity in the network considers the peer entity in the MS having sent the set-up message to be the calling user and asks lower layers to activate the appropriate resources. It then:

1) waits until it is informed by lower (sub-)layers that resource activation was sufficiently successful, then sends a CONNECT message to the calling user, and enters state N2, BC ACTIVE; or

2) sends a CONNECT message to the calling user and enters N3, BC ESTABLISHMENT PROCEEDING. In state N3, the BCC entity is informed by lower layers whenever the status of resources for the broadcast call is changed. When informed that activation of resources was sufficiently successful, the BCC entity in the network enters state N2, ACTIVE.

—The CONNECT message specifies the broadcast call reference of the broadcast call and indicates that the MS is the originator of the broadcast call.

In case b), the further proceeding is as defined in subclause 6.2.2.1.

In state U0.p or U1, the BCC entity in the MS shall, on receipt of a CONNECT message, establish the conditions defined for state U2, ACTIVE and the suitable sub-state (see subclause 6.1.2.1), stop timer $T_{MM\text{-}est}$ (if running) and enter state U2, ACTIVE. If the immediate set-up procedure has been used, the BCC entity in the MS shall inform lower sub-layers that the MM connection has been implicitly established.

6.2.2.1 Termination during mobile originated establishment

At any time during the mobile originated establishment of a broadcast call, the network may decide to terminate the connection between the two peer entities in the network and MS. In this case the network sends a TERMINATION message to the MS specifying the appropriate cause; it may ask lower (sub-)layers to release associated resources. The further actions are specified in subclause 6.4.

During mobile originated establishment of a broadcast call, the MS may abort the broadcast call, see subclause 6.4.

6.2.2.2 Abnormal cases

At expiry of $T_{MM\text{-}est}$, or radio link failure (see 3GPP TS 44.018), the BCC entity in the MS requests lower sub-layers to abort the MM connection establishment and returns to state U0, NULL(this includes clearing of the context related to the broadcast call establishment).

On receipt of an indication of lower sub-layers that the MM connection establishment was unsuccessful, the BCC entity in the MS returns to state U0, NULL (this includes clearing of the context related to the broadcast call establishment).

6.3.3 Mobile station procedures in the RECEIVE MODE ACTIVE state

In state U6, RECEIVE MODE ACTIVE, the BCC entity in the MS performs, on receipt of messages from its peer entity, on request of higher layers, and on indication of lower sub-layers, actions as defined below.

On request of higher layers, the MS initiates abort of the broadcast call, see subclause 6.4.

If the network initiates broadcast call abortion or termination, the MS reacts as specified in subclause 6.4.

Upon indication from lower layers that no channel is available, the BCC entity in the MS informs higher layers and starts timer $T_{no\ channel}$. Then:

- if $T_{no\ channel}$ expires, the BCC entity in the MS informs higher layers, asks lower sub-layers to abort resources and enters the idle state;
- upon indication from lower layers that a channel is available, the BCC entity in the MS informs higher layers and stops timer $T_{no\ channel}$.

8.3a IMMEDIATE SETUP 2

This message is sent by the MS to the network in order to set-up a group call immediately, i.e. without previous establishment of an MM connection, and to include compressed originator-to dispatcher information. The message shall only be used if the MS has a valid TMSI. See table 8.3a.

Message type: IMMEDIATE SETUP 2;

Significance: dual

Direction: MS to network.

Table 8.3a: IMMEDIATE SETUP 2 message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 9.1	M	V	1/2
	Transaction identifier	Transaction identifier 9.2	M	V	1/2
	Message type	Message type 9.3	M	V	1
	Spare half octet	Spare half octet 9.4.6	M	V	½
	Ciphering key sequence number	Ciphering key sequence number 3GPP TS 24.008, 10.5.1.2	M	V	½
	Mobile station classmark	Mobile station classmark 2 3GPP TS 24.008, 10.5.1.6	M	LV	4
	TMSI	TMSI/P-TMSI 3GPP TS 44.018, 10.5.2.42	M	V	4
	Group identity	Call reference 9.4.1	M	V	4
	Compressed otdi	Compressed otdi 9.4.7	M	V	5

8.3a.1 TMSI

The *TMSI* information element indicates the Temporary Mobile Subscriber Identity of the MS.

8.3a.2 Compressed otdi

This information element contains compressed originator-to-dispatcher information.

9.4.3 Cause

The purpose of the *cause* information element is to describe the reason for generating certain messages and to provide diagnostic information in the event of procedural errors.

The *cause* information element is a type 4 information element. Its value part has a minimal length of 1 octet. The maximum length is given by the maximum number of octets in a L3 message (see ~~GSM 04.06~~3GPP TS 44.006).

The value part is coded as shown below:

<*cause* > ::= **1 cause_part** [**diagnostics** *]*

| **0 cause_part** <*cause*>

Attributes

The **cause_part** field defines a non-negative integer N. If more than one **cause_part** fields are present in <*cause*>, the information element indicates an unspecific cause; otherwise, it indicates a cause as defined by N.

Field contents