3GPP TSG_CN **Tdoc NP-000301**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **TSG_N WG4**

Title: **Functional CRs to 3G Work Item "Technical Enhancement and Improvements"**

Agenda item: **6.6.4**

Document for: **APPROVAL**

Introduction:

This document contains **"9"** Functional CRs on **Work Item "Technical Enhancement and Improvements",** that have been agreed by **TSG_N WG4,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

TDoc	SPEC	CR	REV	PHAS	VERS	SUBJECT	CAT	NEW_VERS
N4-000403	03.03	A047		2	4.10.0	Hexa IMEI	C	4.11.0
N4-000220	23.003	019		R99	3.4.0	Missing UTRAN identifiers	B	3.5.0
N2B000217	23.008	017		R99	3.3.0	Addition of subscribed charging characteristics information	B	3.4.0
N4-000224	23.008	029		R99	3.3.0	Addition of charging characteristics per PDP context	B	3.4.0
N4-000071	23.016	013	1	R99	3.4.0	Addition of information related to charging	B	3.5.0
N4-000225	23.016	015		R99	3.4.0	Addition of charging characteristics per PDP context	B	3.5.0
N4-000326	29.002	135	1	R99	3.4.0	Addition of charging characteristics per PDP context	B	3.5.0
N4-000030	29.060	085		R99	3.4.0	Mandatory inclusion of IMSI in SGSN Context Response if P-	C	3.5.0
N4-000327	29.060	101	1	R99	3.4.0	Addition of charging characteristics per PDP context	B	3.5.0

3GPP TSG-CN WG4
22-26 May 2000
Rotenburg, Germany

Document *N4-000403*
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

03.03	**CR**	**A047**	Current Version:	4.10.0

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

For submission to:	CN#08	For approval	X	strategic		*(for SMG*
list expected approval meeting # here ↑		for information		non-strategic	X	*use only)*

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

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

Source:	N4			**Date:**	30.05.00	
Subject:	Hexa IMEI					
Work item:	TEI					

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

Reason for change:

The current IMEI structure is proposed to be changed to use hexadecimal coding instead of current BCD. The usage of "F" in hexadecimal IMEI is restricted, because in the case of emergency call without SIM-card, the IMEI is used as calling party number. The calling party number is used in ISUP and according to ISUP specifications (Q.762, Q.763, and Q.764), "F" is not allowed in calling party number.

The change is proposed in 3GPP TSG-CN,TSG-S, TSG-T and TSG-R to allow 11.4 million mobile terminals to be produced with one Type Approval Code. The current restriction for one million units per TAC is already a problem in the GSM terminal manufacturing and can only be predicted to worsen in the future.

Change to use hexadecimal coding is most simple since it does not affect to existing message lengths in GSM air interface and network interfaces.

The proposal is to have certain deadline, after which all networks support hexadecimal coded IMEI. This should take care of the compability issues between hexadecimal and decimal coded IMEI. The feasibility of the whole hexadecimal IMEI scheme will be decided in coming TSG-CN and TSG-SA plenaries.

Clauses affected: 6.2.1, 6.2.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications	X	→ List of CRs:	04.08, 02.16
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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

6.2.1 Composition of IMEI

The International Mobile station Equipment Identity (IMEI) is composed as shown in figure 8.

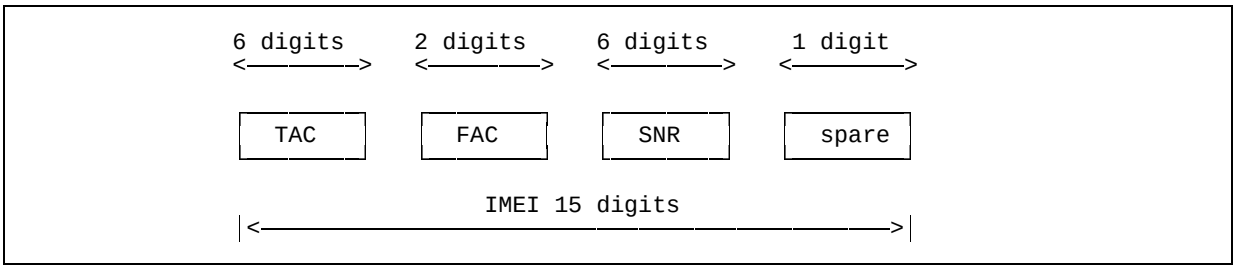


Figure 8: Structure of IMEI

The IMEI is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;

- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;

- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.

- Spare digit: this digit shall be zero, when transmitted by the Mobile Station.

The security requirements of the IMEI are defined in TS GSM 02.16.

6.2.2 Composition of IMEISV

The International Mobile station Equipment Identity and Software Version Number (IMEISV) is composed as shown in figure 9.

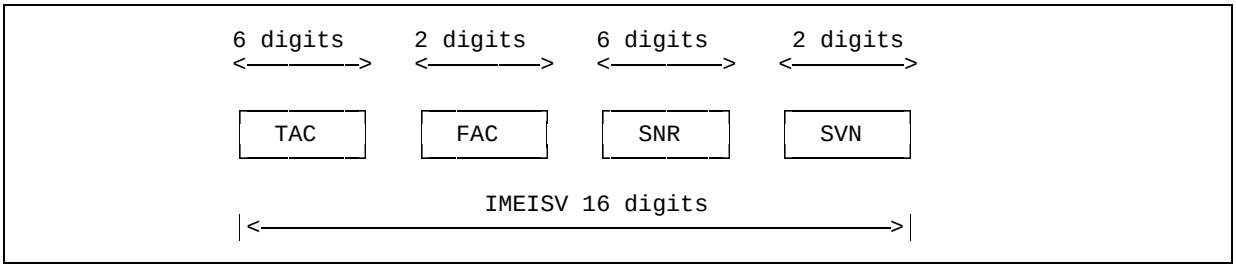


Figure 9: Structure of IMEISV

The IMEISV is composed of the following elements (each element shall consist of hexadecimal digits excluding the digit 'F' due to ISUP restrictions i.e. values (0-E) are allowed only):

- Type Approval Code (TAC). Its length is 6 digits;

- Final Assembly Code (FAC) identifies the place of manufacture/final assembly. Its length is 2 digits;

- Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC and FAC. Its length is 6 digits.

- Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.

Regarding updates of the IMEISV: the TAC, FAC and SNR shall be protected against change after the ME's final production process, i.e. only the SVN part of the IMEISV can be modified (see GSM 02.16).

6.3 Allocation principles

The Type Approval Code (TAC) is issued by a central body.

The place of final assembly (FAC) is encoded by the manufacturer.

Manufacturers shall allocate individual serial numbers (SNR) in a sequential order.

For a given ME, the combination of TAC, FAC and SNR used in the IMEI shall duplicate the combination of TAC, FAC and SNR used in the IMEISV.

The Software Version Number is allocated by the manufacturer after authorisation by the type approval authority. SVN value 99 is reserved for future use.

The IMEI digit values have restrictions which are modified at cut-off date. Before the CUT-OFF DATE (TBD) only bcd coded values (0-9) are allowed. After CUT-OFF DATE (TBD) IMEI digits may have hexadecimal values excluding the digit 'F' i.e. values (0-E) are allowed.

3GPP TSG CN SWG4 Meeting #2
Rotenburg, Germany, 22 – 26 May 2000

Document N4-000220

CHANGE REQUEST

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

23.003	CR	019	Current Version:	3.3.0

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

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

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available*

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

Source: N4 **Date:** 2000-04-20

Subject: Missing UTRAN identifiers

Work item: TEI

Category: *(only one category shall be marked with an X)*

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

Reason for change: This CR specifies editorial modification of 3G TS 23.003 to include UTRAN identifiers.

Clauses affected: 1, 1.1, 12 (new section)

Other specs affected:

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

Other comments:

1 Scope

The present document defines:

a) an identification plan for mobile subscribers in the GSM system;

b) principles of assigning telephone and ISDN numbers to MSs in the country of registration of the MS;

c) principles of assigning Mobile Station (MS) roaming numbers to visiting MSs;

d) an identification plan for location areas, routing areas, and base stations in the GSM system;

e) an identification plan for MSCs, SGSNs, GGSNs, and location registers in the GSM system;

f) principles of assigning international mobile equipment identities;

g) principles of assigning zones for regional subscription;

h) an identification plan for groups of subscribers to the Voice Group Call Service (VGCS) and to the Voice Broadcast Service (VBS); and identification plan for voice group calls and voice broadcast calls; an identification plan for group call areas;

i) principles for assigning Packet Data Protocol (PDP) addresses to mobile stations;

j) an identification plan for point-to-multipoint data transmission groups~~.~~;

k) an identification plan for CN domain, RNC and service area in the UTRAN system.

1.1 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

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

[2] GSM 03.08: "Digital cellular telecommunications system (Phase 2+); Organization of subscriber data".

[3] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[4] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions Related to Mobile Station (MS) in Idle Mode".

[5] GSM 03.70: "Digital cellular telecommunications system (Phase 2+); Routeing of calls to/from Public Data Networks (PDN)".

[6] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[7] GSM 09.03: "Digital cellular telecommunications system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[8] GSM 09.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[9] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[10] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[11] CCITT Recommendation E.212: "Identification plan for land MSs".

[12] CCITT Recommendation E.213: "Telephone and ISDN numbering plan for land MSs in public land mobile networks (PLMN)".

[13] CCITT Recommendation X.121: "International numbering plan for public data networks".

[14] RFC 791: "Internet Protocol".

[15] RFC 1883: "Internet Protocol, Version 6 (IPv6) Specification".

[16] 3G TS 25.401: "UTRAN Overall Description".

[17] 3G TS 25.413: "UTRAN Iu Interface RANAP Signalling".

Next Change

12 Identification of PLMN, RNC, Service Area, CN domain

The following subclauses describe identifiers that are used by both CN and UTRAN across the Iu interface. For identifiers that are solely used within UTRAN, see 3G TS 25.413.

12.1 PLMN Identifier

A Public Land Mobile Network is uniquely identified by its PLMN identifier. PLMN-Id is made of Mobile Country Code (MCC) and Mobile Network Code (MNC).

- **PLMN-Id = MCC + MNC**

The MCC and MNC are predefined within a UTRAN, and set in the RNC via O&M.

12.2 CN Domain Identifier

A CN Domain Edge Node is identified within UTRAN by its CN Domain Identifier. The CN Domain identifier is used over UTRAN interfaces to identify a particular CN Domain Edge Node for relocation purposes. The CN Domain identifier for Circuit Switching (CS) is made of the PLMN-Id and the LAC, whereas for Packet Switching (PS) it is made of the PLMN-Id, the LAC, and the RAC of the first accessed cell in the target RNS.

The two following CN Domains Identifiers are defined:

- **CN CS Domain-Id = PLMN-Id + LAC**
- **CN PS Domain-Id = PLMN-Id + LAC+ RAC**

The LAC and RAC are defined by the operator, and set in the RNC via O&M.

For syntax description and the usage of this identifier in RANAP signalling, see 3G TS 25.413.

12.3 RNC Identifier

An RNC node is uniquely identified within UTRAN by its RNC Identifier (RNC-Id). RNC-Id together with the PLMN identifier is used to globally identify the RNC. RNC-Id or the RNC-Id together with the PLMN-Id is used as RNC identifier in UTRAN Iub, Iur and Iu interfaces. SRNC-Id is the RNC-Id of the SRNC. C-RNC-Id is the RNC-Id of the controlling RNC. D-RNC-Id is the RNC Id of the drift RNC.

- **Global RNC-Id = PLMN-Id + RNC-Id**

The RNC-Id is defined by the operator, and set in the RNC via O&M

For syntax description and the usage of this identifier in RANAP signalling, see 3G TS 25.413.

12.4 Service Area Identifier

The Service Area Identifier (SAI) is used to uniquely identify an area consisting of one or more cells belonging to the same Location Area. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN.

The Service Area Code (SAC) together with the PLMN-Id and the LAC will constitute the Service Area Identifier.

- **SAI = PLMN-Id + LAC + SAC**

The SAC is defined by the operator, and set in the RNC via O&M.

For syntax description and the usage of this identifier in RANAP signalling, see 3G TS 25.413.

3GPP TSG CN WG2 SWGB Meeting
Milan, Italy, 14-16 Feb 2000

Document N2B000217
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.008	CR	017	Current Version:	3.3.0

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

For submission to: CN#08					
list expected approval meeting # here ↑	for approval	X	strategic		*(for SMG use only)*
	for information		non-strategic	X	

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

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

Source: N4 **Date:** 4.2.2000

Subject: Addition of subscribed charging characteristics information

Work item: TEI

Category: *(only one category shall be marked with an X)*

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

Reason for change: This CR aligns 3G TS 23.008 with the work that has been done in TSG SA WG2. This CR introduces subscribed charging characteristics information which is stored in the HLR, SGSN and GGSN.

Clauses affected: 2, 3

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.016
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

help.doc

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

2 Definition of subscriber data

< next added section >

2.18 Data related to charging

2.18.1 Subscribed Charging Characteristics

Subscribed Charging Characteristics specifies whether the subscriber is a normal, prepaid, flat rate and/or hot billing subscriber.

Subscribed Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN, and GGSN (see 3G TS 23.060).

< next modified chapter >

3 Summary of data stored in location registers

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN ~~TYPE~~	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C (Gs)	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.4.1/1.8	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.4.2/1.9	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
SGSN Supported CAMEL Phases	2.14.2.3	C	-	-	-	P
Age Indicator	2.16.1	C	-	C	-	T
Subscribed Charging Characteristics	2.18.1	C	-	C	C	P

NOTE: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
(Gs): The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

a): This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE: For special condition of storage see in the clauses 2.x.y referred-to.
See clause 3 for explanation of M,C,T and P in table 2.

3GPP TSG CN4 Meeting #2
Rotenburg, Germany, 22-26 May 2000

Document N4-000224

CHANGE REQUEST

23.008	CR	029	Current Version:	3.3.0

For submission to: CN#08 — for approval [X] — for information [ ] — strategic [ ] — non-strategic [X]

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

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

Source: N4 **Date:** 11 May 2000

Subject: Addition of charging characteristics per PDP context

Work item: TEI

Category:

F	Correction	[ ]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[X]
C	Functional modification of feature	[ ]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change: Currently it is possible to define, for the GPRS subscribers, charging characteristics reflecting the method used to charge, e.g. normal subscription, prepaid, flat rate and/or hot billing. However, a user may have subscribed to several services requiring different charging methods, i.e. one service may be charged as normal and the other as prepaid. Therefore, in order to have more flexibility, it is proposed to add charging characteristics on a PDP context basis. If both subscriber and PDP context charging characteristics are present in the user's data, the PDP context charging will have priority.

Clauses affected:

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	23.016, 23.060, 29.002, 29.060, 32.015
Other GSM core specifications	[ ]	→ List of CRs:	
MS test specifications	[ ]	→ List of CRs:	
BSS test specifications	[ ]	→ List of CRs:	
O&M specifications	[ ]	→ List of CRs:	

Other comments:

FIRST MODIFIED SECTION

2.13 Data related to GPRS NAM

The data listed in this subclause pertain to the Network Access Mode "GPRS" and have no counterpart for non-GPRS.

(…)

2.13.xx PDP Context Charging Characteristics

PDP Context Charging Charactertistics is defined in 3G TS 32.015. It indicates the charging type to be applied to the PDP context.

PDP Context Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

NEXT MODIFIED SECTION

4 Accessing subscriber data

(…)

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P Note
Network Access Mode	2.1.1.2	M	-	C (a)	-	P Note
International MS ISDN number	2.1.2	M	M	M	-	T
multinumbering MSISDNs	2.1.3	C	-	-	-	T Note
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T .
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.5	-	-	C	-	T Note
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T Note
IMEI	2.1.9	-	-	C	-	T
RAND/SRES and Kc	2.3.1		-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C (Gs)	-	T
SGSN Number	2.4.8.1	M	C (Gs)	-	-	T Note
GGSN Number	2.4.8.2	M	-	-	-	P Note
RSZI Lists	2.4.11.1	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
LA not allowed flag	2.4.13	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C		P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	C		P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-	C	-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T Note
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C (Gs)	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.xx	C	-	C	C	P
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.4.1/1.8	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.4.2/1.9	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
SGSN Supported CAMEL Phases	2.14.2.3	C	-	-	-	P
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.16.1	C	-	C	-	T

NOTE: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
(Gs): The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

a): This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE: For special condition of storage see in the clauses 2.x.y referred-to.
See clause 3 for explanation of M,C,T and P in table 2.

3GPP TSG-CN WG4 Meeting #01
Charleston, USA, 27 - 31 March, 2000

Document N4-000071
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.016	**CR**	**013r1**	Current Version:	3.3.0

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

For submission to: CN#08					
list expected approval meeting # here ↑	for approval	X	strategic		*(for SMG use only)*
	for information		non-strategic	X	

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

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

Source: N4 **Date:** 27.3.2000

Subject: Addition of information related to charging

Work item: TEI

Category: *(only one category shall be marked with an X)*

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

Reason for change: This CR aligns the 23.016 with the work that has been done in the TSG SA WG2. This CR adds information related to charging as part of the shared GPRS subscriber data.

Clauses affected: 3.2, 4.4

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.008
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


help.doc

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

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in GSM 03.08, GSM 03.71 and in GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications.

Voice Broadcast Service (VBS), Voice Group Call Service (VGCS) and enhanced Multi Level Precedence and Pre-emption Service (eMLPP) Data related to group call area, cell or dispatcher attributes is only stored in the Group Call Register (GCR) which is linked to each MSC/VLR.

The GCR and its stored data is out of scope of this specification.

Subscriber related VBS, VGCS and eMLPP Data only concerns entitlement data for these-services and is seen as shared non-GPRS subscriber data.

GPRS and non-GPRS subscriber data:

The HLR has to download data to the VLR and to the SGSN. In this specification those data sent to the VLR are called non-GPRS subscriber data and those data sent to the SGSN are called GPRS subscriber data.

Whenever the refining identifier non-GPRS or GPRS is missing a common rule is addressed which hold for both kinds of subscriber data.

Subscriber data specific to non-GPRS shall only be sent from the HLR to the VLR. Subscriber data specific to GPRS shall only be sent from the HLR to the SGSN.

Subscriber data common to both non-GPRS and GPRS (regional subscription information) are downloaded from the HLR to both entities.

Shared non-GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and VLR. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared subscriber data includes:

BS: Bearer Service (see GSM 02.02);

TS: Teleservice (see GSM 02.03);

BSG: Basic Service Group (see GSM 02.01, GSM 02.04 and GSM 03.11);

EBSG: Elementary Basic Service Group (see GSM 03.11);

CBSG: Collective Basic Service Group (see GSM 03.11);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see 3G TS 23.116);

IST Information: Immediate Service Termination Information (see GSM 03.35).

Shared GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and SGSN. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared GPRS subscriber data includes:

TS: Teleservice (see GSM 02.03);

PDP Context (see GSM 03.60);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see 3G TS 23.116);

Charging Information (see 3G TS 23.060).

Mandatory data:

Data required to form a self-consistent set of subscriber data. The context governs whether a specific parameter is mandatory, e.g. the data set for a specific service may be optional, however if data for this service is present, then parameters within this data set may be mandatory.

Mandatory data is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15, GSM 03.71) and by PLMN defined requirements.

NOTE: The above definition is seen from a semantic point of view. Semantically, mandatory parameters may be defined as syntactically optional or mandatory by the protocol.

Optional data:

Data which is defined as subscriber data, but which is not required to form a self-consistent set of subscriber data; the context governs whether a specific parameter is optional.

Optional data is data which is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15, GSM 03.71) or by PLMN defined requirements but is not defined as mandatory data.

NOTE: The above definition is seen from a semantic point of view. Semantically optional parameters are always defined as syntactically optional by the protocol.

Missing data:

Data which is mandatory in a given context but is not received nor is valid data available locally.

Unexpected data:

Data which is received and cannot be further processed. This may be either:

- optional data not required in a given context; or
- optional or mandatory data, required in this context but received with an unexpected value.

Overlapping data:

Two different cases of overlapping within subscriber data are possible:

- two or more parameters are to be stored at the same address in the data structure (see subclause 4.4);
- two or more BSGs within a BSG list include or are identical with one and the same EBSG.

The following **groups of non-GPRS subscriber information** are defined:

- Subscriber information (Group A):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - category;
  - subscriber status,
  - LMU identifier
- Basic service information (Group B):
  - Bearer Service list;
  - Teleservice list.

NOTE: VBS and VGCS entitlement data are subsumed under Teleservices

- Supplementary Service (SS) information (Group C):
  - forwarding information;
  - call barring information;

  - Closed User Group (CUG) information;
  - eMLPP data;
  - SS Data;
- Operator Determined Barring (ODB) information (Group D):
  - ODB Data for non-GPRS services;
- Roaming restriction information (Group E):
  - roaming restriction due to unsupported feature;
- Regional subscription information (Group F):
  - regional subscription data.
- VBS/VGCS subscription information (Group G):
  - VBS subscription data;
  - VGCS subscription data.
- CAMEL subscription information (Group H):
  - Originating CAMEL Subscription Information (O-CSI);
  - Dialled Service CAMEL Subscription Information (D-CSI);
  - VMSC Terminating CAMEL Subscription Information (VT-CSI);
  - Supplementary Service Invocation Notification CAMEL Subscription Information (SS-CSI);
  - Translation Information Flag CAMEL Subscription Information (TIF-CSI);
  - SMS CAMEL Subscription Information (SMS-CSI);
  - Mobility Management Event Notification CAMEL Subscription Information (M-CSI).
- LSA Information (Group I):
  - LSA data.
- Super-Charger (SC) Information (Group K):
  - Age Indicator
- Location Services (LCS) information (Group X)
  - GMLC List
  - LCS Privacy Exception List
  - MO-LR List
- IST Information (Group J):
  - IST data.

The following **groups of GPRS subscriber information** are defined:

- Subscriber information (Group P1):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - subscriber status;
- Basic service information (Group P2):

  - Teleservice list.

- Operator Determined Barring (ODB) information (Group P3):
  - ODB Data for GPRS services;
- Roaming restriction information (Group P4):
  - roaming restriction in SGSN due to unsupported feature;
- Regional subscription information (Group P5):
  - regional subscription data.
- GPRS subscription information (Group P6):
  - GPRS subscription data.
- SGSN CAMEL subscription information (Group P7):
  - GPRS CAMEL subscription information;
  - SMS CAMEL subscription information.
- LSA Information (Group P8):
  - LSA data.
- Super-Charger (SC) Information (Group P9):
  - Age Indicator.
- Charging Information (Group P10):
  - Subscribed Charging Characteristics.

< next modified section >

4.3.1 Order of information sent by the HLR

The order of information is defined by the order in which the transfer syntax is generated by the HLR. This includes a sequence of messages as well as the syntax within a message (first to last message, component, operation, parameter, etc.).

With the above definitions, the following rules shall apply for non-GPRS subscriber data for the order of information within an HLR-VLR dialogue:

- Group A information (subscriber status) shall be sent first;
- Group B information shall be sent after Group A information and before any Group C, E, F, G, H, J or X information;
- Group D information shall be sent after Group A information and in any order with respect to Group B, C, E, F, G, H, J, K and X information.
- a specific order of Group C, E, F, G, H, J, K or X information is not required.

There is no requirement for the sending of subscriber information groups in the same message.

With the above definitions, the following rules shall apply for GPRS subscriber data for the order of information within a dialogue:

- Group P1 information (subscriber status) shall be sent first;
- Group P2 information shall be sent after P1 information and before P4 and P5 information

- Group P3 information shall be sent after Group P1 information and in any order with respect to Group P2, P4, P5, P6, P7, P8 and P8 information.

- a specific order of Group P4, P5, P6, P9 and ~~P9~~ P10 information is not required.

< next modified section >

4.4 Abstract data structure of shared subscriber data

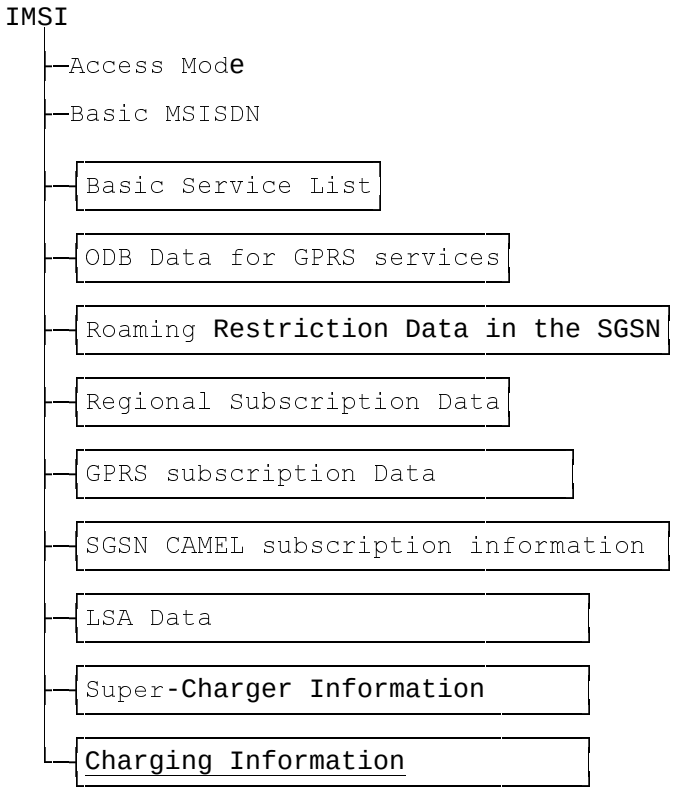
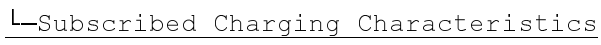


Figure 2: Abstract data structure of GPRS Subscriber Data (Data sent to the SGSN)



NOTE: For detailed information see 3G TS 23.060.

Figure XX: Charging Information.

3GPP TSG CN4 Meeting #2
Rotenburg, Germany, 22-26 May 2000

Document* *N4-000225

CHANGE REQUEST

23.016	**CR**	**015**	Current Version:	3.4.0

For submission to: CN#08 — for approval [X] — for information [ ] — strategic [ ] — non-strategic [X]

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

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

Source: N4 **Date:** 11 May 2000

Subject: Addition of charging characteristics per PDP context

Work item: TEI

Category:

F	Correction	[ ]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[X]
C	Functional modification of feature	[ ]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change: Currently it is possible to define, for the GPRS subscribers, charging characteristics reflecting the method used to charge, e.g. normal subscription, prepaid, flat rate and/or hot billing. However, a user may have subscribed to several services requiring different charging methods, i.e. one service may be charged as normal and the other as prepaid. Therefore, in order to have more flexibility, it is proposed to add charging characteristics on a PDP context basis. If both subscriber and PDP context charging characteristics are present in the user's data, the PDP context charging will have priority.

Clauses affected:

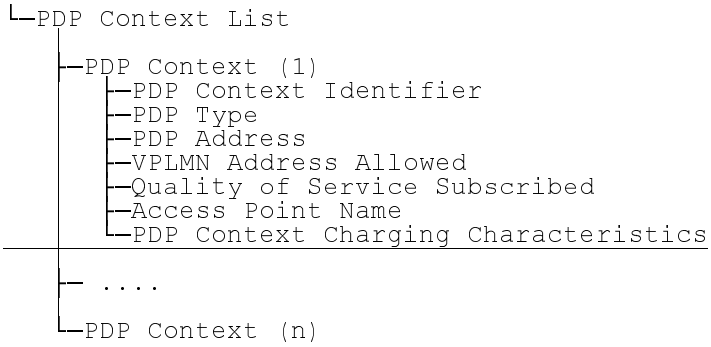
Other specs affected:

Other 3G core specifications	[X]	→ List of CRs: 23.008, 23.060, 29.002, 29.060, 32.015
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

FIRST MODIFIED SECTION

4 General on handling of subscriber information



NOTE: The figure shows the information in the SGSN. For detailed information see GSM 03.60. For information about the GGSN information, see GSM 03.08.

Figure 17: GPRS subscription data

3GPP TSG CN4 Meeting #2
Rotenburg, Germany, 22-26 May 2000

Document* *N4-000326

CHANGE REQUEST

29.002	**CR**	**135r1**	Current Version:	3.4.0

For submission to: CN#08 | for approval [X] | for information [ ] | strategic [ ] | non-strategic [X]

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

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

Source: N4 **Date:** 22 May 2000

Subject: Addition of charging characteristics per PDP context

Work item: TEI

Category:

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

Reason for change:

Currently it is possible to define, for the GPRS subscribers, charging characteristics reflecting the method used to charge, e.g. normal subscription, prepaid, flat rate and/or hot billing. However, a user may have subscribed to several services requiring different charging methods, i.e. one service may be charged as normal and the other as prepaid. Therefore, in order to have more flexibility, it is proposed to add charging characteristics on a PDP context basis. If both subscriber and PDP context charging characteristics are present in the user's data, the PDP context charging will have priority.

The length of the charging characteristics is extended to 2 bytes.

Clauses affected:

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	23.008, 23.016, 23.060, 29.060, 32.015
Other GSM core specifications	[ ]	→ List of CRs:	
MS test specifications	[ ]	→ List of CRs:	
BSS test specifications	[ ]	→ List of CRs:	
O&M specifications	[ ]	→ List of CRs:	

Other comments:

FIRST MODIFIED SECTION

7.6.2.xx PDP-Charging Characteristics

This parameter indicates the charging characteristics associated with a specific PDP context as defined in 3G TS 32.015.

NEXT MODIFIED SECTION

17.7 MAP constants and data types

17.7.1 Mobile Service data types

(…)

-- subscriber management types

```
InsertSubscriberDataArg ::= SEQUENCE {
     imsi                              [0] IMSI                              OPTIONAL,
     COMPONENTS OF                     SubscriberData,
     extensionContainer                [14] ExtensionContainer               OPTIONAL,
     ... ,
     naea-PreferredCI                  [15] NAEA-PreferredCI                 OPTIONAL,
     -- naea-PreferredCI is included at the discretion of the HLR operator.
     gprsSubscriptionData              [16] GPRSSubscriptionData             OPTIONAL,
     roamingRestrictedInSgsnDueToUnsupportedFeature [23]                     NULL
                                                                             OPTIONAL,
     networkAccessMode                 [24] NetworkAccessMode                OPTIONAL,
     lsaInformation                    [25] LSAInformation                   OPTIONAL,
     lmu-Indicator                     [21] NULL                             OPTIONAL,
     lcsInformation                    [22] LCSInformation                   OPTIONAL,
          istAlertTimer                [26] IST-AlertTimerValue              OPTIONAL,
          superChargerSupportedInHLR   [27] AgeIndicator                     OPTIONAL,
          mc-SS-Info                   [28] MC-SS-Info                       OPTIONAL,
     cs-AllocationRetentionPriority    [29] CS-AllocationRetentionPriority   OPTIONAL
 }
     -- If the Network Access Mode parameter is sent, it shall be present only in
     -- the first sequence if seqmentation is used
```

```
CS-AllocationRetentionPriority ::= OCTET STRING (SIZE (1))
     -- This data type encodes each priority level defined in TS 23.107 as the binary value
     -- of the priority level.
```

```
IST-AlertTimerValue ::= INTEGER (15..255)
```

```
LCSInformation ::= SEQUENCE {
     gmlc-List [0]                     GMLC-List OPTIONAL,
     lcs-PrivacyExceptionList          [1]  LCS-PrivacyExceptionList     OPTIONAL,
     molr-List                         [2]  MOLR-List                    OPTIONAL,
     ...}
```

```
GMLC-List ::= SEQUENCE SIZE (1..maxNumOfGMLC) OF
                                       ISDN-AddressString
     -- if segmentation is used, the complete GMLC-List shall be sent in one segment
```

```
maxNumOfGMLC  INTEGER ::= 5
```

```
NetworkAccessMode ::= ENUMERATED {
     bothMSCAndSGSN                    (0),
     onlyMSC                           (1),
     onlySGSN                          (2),
     ...}
     -- if unknown values are received in NetworkAccessMode
     -- they shall be discarded.
```

```
GPRSDataList ::= SEQUENCE SIZE (1..maxNumOfPDP-Contexts) OF
                                       PDP-Context
```

```
maxNumOfPDP-Contexts  INTEGER ::= 50
```

```
PDP-Context ::= SEQUENCE {
    pdp-ContextId                   ContextId,
    pdp-Type                        [16] PDP-Type,
    pdp-Address                     [17] PDP-Address                OPTIONAL,
    qos-Subscribed                  [18] QoS-Subscribed,
    vplmnAddressAllowed             [19] NULL OPTIONAL,
    apn                             [20] APN,
    extensionContainer              [21] ExtensionContainer         OPTIONAL,
    ... ,
    ext-QoS-Subscribed              [0] Ext-QoS-Subscribed          OPTIONAL,
    pdp-ChargingCharacteristics     [xx] ChargingCharacteristics    OPTIONAL }
    -- qos-Subscribed shall be discarded if ext-QoS-Subscribed is received and supported
```

```
ContextId ::= INTEGER (1..maxNumOfPDP-Contexts)
```

```
GPRSSubscriptionData ::= SEQUENCE {
    completeDataListIncluded        NULL                            OPTIONAL,

        -- If segmentation is used, completeDataListIncluded may only be present in the
        -- first segment.
    gprsDataList                    [1]  GPRSDataList,
    extensionContainer              [2] ExtensionContainer          OPTIONAL,
    ... ,
    sgsn-CAMEL-SubscriptionInfo     [3] SGSN-CAMEL-SubscriptionInfo OPTIONAL,
    chargingCharacteristics         [4]  ChargingCharacteristics    OPTIONAL }
```

```
SGSN-CAMEL-SubscriptionInfo ::= SEQUENCE {
    gprs-CSI                        [0]  GPRS-CSI                   OPTIONAL,
    sms-CSI                         [1]  SMS-CSI                    OPTIONAL,
    extensionContainer              [2]  ExtensionContainer         OPTIONAL,
    ...}
```

```
GPRS-CSI ::= SEQUENCE {
    gprs-CamelTDPDataList           [0] GPRS-CamelTDPDataList,
    camelCapabilityHandling         [1] CamelCapabilityHandling,
    extensionContainer              [2] ExtensionContainer          OPTIONAL,
    notificationToCSE               [3]  NULL                       OPTIONAL,
    csiActive                       [4]  NULL                       OPTIONAL,
    ...}
--  notificationToCSE and csiActive shall not be present when GPRS-CSI is sent to SGSN.
--  They may only be included in ATSI/ATM Ack message.
```

```
GPRS-CamelTDPDataList ::= SEQUENCE SIZE (1..maxNumOfCamelTDPData) OF
    GPRS-CamelTDPData
--  GPRS-CamelTDPDataList shall not contain more than one instance of
--  GPRS-CamelTDPData containing the same value for gprs-TriggerDetectionPoint.
```

```
GPRS-CamelTDPData ::= SEQUENCE {
    gprs-TriggerDetectionPoint      [0] GPRS-TriggerDetectionPoint,
    serviceKey                      [1] ServiceKey,
    gsmSCF-Address                  [2] ISDN-AddressString,
    defaultSessionHandling          [3] DefaultGPRS-Handling,
    extensionContainer              [4] ExtensionContainer          OPTIONAL,
    ...
    }
```

```
DefaultGPRS-Handling ::= ENUMERATED {
    continueTransaction (0) ,
    releaseTransaction (1) ,
    ...}
-- exception handling:
-- reception of values in range 2-31 shall be treated as "continueTransaction"
-- reception of values greater than 31 shall be treated as "releaseTransaction"
```

```
GPRS-TriggerDetectionPoint ::= ENUMERATED {
    attach                                  (1),
    attachChangeOfPosition                  (2),
    pdp-ContextEstablishment                (11),
    pdp-ContextEstablishmentAcknowledgement (12),
    pdp-ContextChangeOfPosition             (14),
    ... }
-- exception handling:
-- For GPRS-CamelTDPData sequences containing this parameter with any
-- other value than the ones listed the receiver shall ignore the whole
-- GPRS-CamelTDPDatasequence.
```

```
APN ::=  OCTET STRING (SIZE (2..63))
     -- Octets are coded according to TS GSM 03.03
```

```
PDP-Type ::= OCTET STRING (SIZE (2))
     -- Octets are coded according to TS GSM 09.60
```

```
PDP-Address ::= OCTET STRING (SIZE (1..16))
     -- Octets are coded according to TS GSM 09.60

     -- The possible size values are:
     -- 1-7 octets  X.25 address type
     --  4  octets  IPv4 address type
     -- 16  octets  Ipv6 address type
```

```
QoS-Subscribed ::= OCTET STRING (SIZE (3))
     -- Octets are coded according to TS GSM 04.08.
```

```
Ext-QoS-Subscribed ::= OCTET STRING (SIZE (1..16))
     -- OCTET 1:
     --  Allocation/Retention Priority (This octet encodes each priority level defined in
     --     23.107 as the binary value of the priority level, declaration in 29.060)
     -- OCTET 2:
     --  bits 876: Traffic Class
     --  bit  5: 0 (unused)
     --  bits 43: Delivery order
     --  bits 21: Delivery of erroneous SDU
     -- OCTETS 3-4:
     --  Maximum SDU size
     -- OCTETS 5-6:
     --  Maximum bit rate for uplink
     -- OCTETS 7-8:
     --  Maximum bit rate for downlink
     -- OCTET 9:
     --  Residual BER
     -- OCTET 10:
     --  SDU error ratio
     -- OCTET 11:
     --  Transfer delay
     -- OCTETS 12-13:
     --  Guaranteed bit rate for uplink
     -- OCTETS 14-15:
     --  Guaranteed bit rate for downlink
     -- OCTET 16:
     --  bits 876543: 0 (unused)
     --  bits 21: traffic handling priority
     -- (Octets 2-16 are coded according to 3G TS 24.008 Quality of Service according Octets
     -- 6-20.
```

```
ChargingCharacteristics ::= OCTET STRING (SIZE (21~~)~~)
     -- Octets are coded according to 3G TS 32.015~~ 29.060~~.
```

(…)

3GPP TSG CN4
Charleston, USA 27-31 March 2000

Document N4-000030
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

29.060	CR	085	Current Version:	3.4.0

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

For submission to:	CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

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

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

Source: N4 **Date:** 2 Mar 2000

Subject: Mandatory inclusion of IMSI in SGSN Context Response if P-TMSI Signature Mismatch

Work item: Technical Enhancements and improvements

Category: *(only one category shall be marked with an X)*

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

Reason for change:

This change request seeks to improve the RAU efficiency when a "P-TMSI Signature Mismatch" is the reported error in response to a SGSN Context Request.

The "P-TMSI Signature Mismatch" error implies that the old SGSN was able to locate the MM Context associated with the P-TMSI but the security checking failed. This failure is reported to the new SGSN, which shall perform IMSI validation according to GSM 03.60. However, the new SGSN may not have the IMSI and hence will be forced to request the IMSI from the MS.

It is proposed that the SGSN Context Response is modified to include the IMSI if the MM Context is available in the old SGSN but the security checking fails. This would give the new SGSN the option to authenticate the user, which if successful would allow the new SGSN to retrieve the MM and PDP Context from the old SGSN and complete the Routeing Area Update request. Consequently, the "IMSI not known" error should only be returned if the old SGSN cannot locate the MM Context for a particular P-TMSI value.

Clauses affected: 7.5.4

Other specs affected:

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

Other comments:

help.doc

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

7.5.4 SGSN Context Response

The old SGSN shall send an SGSN Context Response to the new SGSN as a response to a previous SGSN Context Request.

Possible Cause values are:

- 'Request Accepted'
- 'IMSI not known'
- 'System failure'
- 'Mandatory IE incorrect'
- 'Mandatory IE missing'
- 'Optional IE incorrect'
- 'Invalid message format'
- 'Version not supported'
- 'P-TMSI Signature mismatch'

If the Cause contains the value 'Request accepted', all information elements are mandatory, except PDP Context and Private Extension.

If the Cause contains the value 'P-TMSI Signature mismatch' the IMSI information element shall be included in the response, otherwise ~~O~~only the Cause information element shall be included in the response ~~if the Cause contains another value than 'Request accepted'~~.

~~If the Cause contains the value 'Request accepted', all information elements are mandatory, except PDP Context and Private Extension.~~

The Tunnel Endpoint Identifier Signalling field specifies a Tunnel Endpoint Identifier which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent signalling messages which are sent from the new SGSN to the old SGSN and related to the PDP context(s) requested.

The IMSI information element contains the IMSI matching the TLLI or P-TMSI (for GSM or UMTS respectively) and RAI in the SGSN Context Request.

One or several Receive State Variable information elements may be included in the message.

The MM Context contains necessary mobility management and security parameters.

All active PDP contexts in the old SGSN shall be included as PDP Context information elements.

If there is at least one active PDP context, the old SGSN shall start the T3-TUNNEL timer and store the address of the new SGSN in the "New SGSN Address" field of the MM context. The old SGSN shall wait for SGSN Context Acknowledge before sending T-PDUs to the new SGSN. If the old SGSN has one or more active PDP contexts for the subscriber and SGSN Context Acknowledge message is not received within a time defined by T3-RESPONSE, the old SGSN shall retransmit the SGSN Context Response to the new SGSN for as long as the total number of attempts is less than N3-REQUESTS. After N3-REQUESTS unsuccessfully attempts, the old SGSN shall proceed as described in section 'Reliable delivery of signalling messages' in case the transmission of a signalling message fails N3-REQUESTS times.

The optional Private Extension contains vendor or operator specific information.

Table 30: Information elements in a SGSN Context Response

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
IMSI	Conditional	7.7.2
Tunnel Endpoint Identifier Signalling	Conditional	7.7.14
MM Context	Conditional	7.7.19
PDP Context	Conditional	7.7.19
Private Extension	Optional	7.7.26

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Rotenburg, Germany, 22-26 May 2000

Document* *N4-000327

CHANGE REQUEST

29.060	**CR**	**101r1**	Current Version:	3.4.0

For submission to:	CN#08	for approval	X	strategic	
		for information		non-strategic	X

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

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

Source: N4 **Date:** 22 May 2000

Subject: Addition of charging characteristics per PDP context

Work item: TEI

Category:

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

Reason for change:

Currently it is possible to define, for the GPRS subscribers, charging characteristics reflecting the method used to charge, e.g. normal subscription, prepaid, flat rate and/or hot billing. However, a user may have subscribed to several services requiring different charging methods, i.e. one service may be charged as normal and the other as prepaid. Therefore, in order to have more flexibility, it is proposed to add charging characteristics on a PDP context basis. If both subscriber and PDP context charging characteristics are present in the user's data, the PDP context charging will have priority.

The description of the charging characteristics ie makes direct reference to 3G TS 32.015.

Clauses affected:

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.008, 23.016, 23.060, 29.002, 32.015
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

FIRST MODIFIED SECTION

7.3 Tunnel Management Messages

7.3.1 Create PDP Context Request

A Create PDP Context Request shall be sent from a SGSN node to a GGSN node as a part of the GPRS PDP Context Activation procedure. The GGSN IP address where the SGSN sends the Create PDP Context Request is the first IP address in the list of IP addresses provided by the DNS server. After sending the Create PDP Context Request message, the SGSN marks the PDP context as 'waiting for response'. In this state the SGSN shall accept G-PDUs from the GGSN but shall not send these G-PDUs to the MS. A valid request initiates the creation of a tunnel between a PDP Context in a SGSN and a PDP Context in a GGSN. If the procedure is not successfully completed, the SGSN repeats the Create PDP Context Request message to the next GGSN address in the list of IP addresses, if there is one. If the list is exhausted the activation procedure fails.

The Tunnel Endpoint Identifier Data I field specifies a downlink Tunnel Endpoint Identifier for G-PDUs which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink G-PDUs which are related to the requested PDP context.

The Tunnel Endpoint Identifier Signalling field specifies a downlink Tunnel Endpoint Identifier for signalling messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink signalling messages which are related to the requested PDP context. This field shall not be present if there already exists a signalling tunnel for the given MS between the peer GSNs.

The MSISDN of the MS is passed to the GGSN inside the Create PDP Context Request; This additional information can be used when a secure access to a remote application residing on a server is needed. The GGSN would be in fact able to provide the user identity (i. e. the MSISDN) to the remote application server, providing it with the level of trust granted to users through successfully performing the GPRS authentication procedures, without having to re-authenticate the user at the application level.

If the MS requests a dynamic PDP address and a dynamic PDP address is allowed, then the PDP Address field in the End User Address information element shall be empty. If the MS requests a static PDP Address then the PDP Address field in the End User Address information element shall contain the static PDP Address. In case the PDP addresses carried in the End User Address and optionally in the Protocol Configuration Option information element contain contradicting information, the PDP address carried in the End User Address information element takes the higher precedence. The Quality of Service Profile information element shall be the QoS values to be negotiated between the MS and the SGSN at PDP Context activation.

The SGSN shall include an SGSN Address for signalling and an SGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store these SGSN Addresses and use them when sending signalling on this GTP tunnel or G-PDUs to the SGSN for the MS.

The SGSN shall include a Recovery information element into the Create PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Create PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Create PDP Context Request message shall be considered as a valid activation request for the PDP context included in the message.

The SGSN shall include either the MS provided APN, a subscribed APN or an SGSN selected APN in the message; the Access Point Name may be used by the GGSN to differentiate accesses to different external networks.
The Selection Mode information element shall indicate the origin of the APN in the message.

For contexts created by the Secondary PDP Context Activation Procedure the SGSN shall include the linked NSAPI. Linked NSAPI indicates the NSAPI assigned to any one of the already activated PDP contexts for this PDP address and APN.

The Secondary PDP Context Activation Procedure may be executed without providing a Traffic Flow Template (TFT) to the newly activated PDP context if all other active PDP contexts for this PDP address and APN already have an associated TFT, otherwise a TFT shall be provided. TFT is used for packet filtering in the GGSN.

When using the Secondary PDP Context Activation Procedure, the Selection mode, MSISDN, End User Address, Access Point Name and Protocol Configuration Options information elements shall not be included in the message.

The optional Protocol Configuration Options information element is applicable for the end user protocol 'IP' only.

The SGSN shall select one GGSN based on the user provided or SGSN selected APN. The GGSN may have a logical name that is converted to an address. The conversion may be performed with any name-to-address function. The converted address shall be stored in the "GGSN Address in Use" field in the PDP context and be used during the entire lifetime of the PDP context.

NOTE: A DNS query may be used as the name-to-IP address mapping of the GGSN. The IP address returned in the DNS response is then stored in the "GGSN Address in Use" field in the PDP context.

The IMSI information element together with the NSAPI information element uniquely identifies the PDP context to be created.

The SGSN may send a Create PDP Context Request even if the PDP context is already active.

The GGSN shall check if the PDP context already exists for the MS. The existing parameters in the PDP context shall then be replaced with the parameters in the Create PDP Context Request message. If a dynamic PDP address has already been allocated for the existing context, this address should be used and copied to the Create PDP Context Response message.

If the GGSN uses the MNRG flag and the flag is set, the GGSN should treat the Create PDP Context Request as a Note MS Present Request and clear the MNRG flag.

The SGSN shall ~~copy~~ determine Charging Characteristics from the Subscribed Charging Characteristics and/or PDP Context Charging Characteristics ~~if the information is~~depending on the presence of the information~~t~~ in the Packet Domain Subscription Data as defined in 3G TS 23.060 [4].

The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity in the message if GGSN trace is activated. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace request received from the HLR or OMC.

The optional Private Extension contains vendor or operator specific information.

Table 4: Information Elements in a Create PDP Context Request

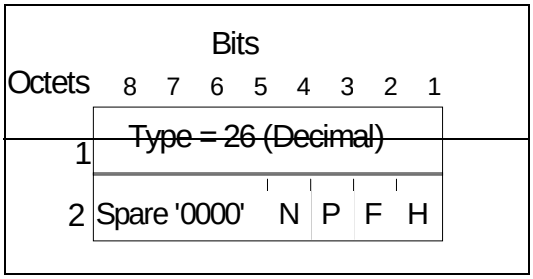
Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Recovery	Optional	7.7.11
Selection mode	Mandatory	7.7.12
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Signalling	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Linked NSAPI	Conditional	7.7.17
Charging Characteristics	Optional	7.7.23
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
End User Address	Conditional	7.7.27
Access Point Name	Conditional	7.7.30
Protocol Configuration Options	Conditional	7.7.31
SGSN Address for signalling	Mandatory	GSN Address 7.7.32
SGSN Address for user traffic	Mandatory	GSN Address 7.7.32
MSISDN	Conditional	7.7.33
Quality of Service Profile	Mandatory	7.7.34
TFT	Conditional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Private Extension	Optional	7.7.44

NEXT MODIFIED SECTION

7.9.23 Charging Characteristics

The charging characteristics information element is a way of informing both the SGSN and GGSN of the rules for producing charging information based on operator configured triggers. For the encoding of this information element see TS 3G 32.015.

~~The Charging Characteristics information element indicates which kind of charging a PDP context is liable for. The N flag indicates normal charging, the P flag indicates prepaid charging, the F flag indicates flat rate charging and the H flag indicates charging by hot billing. One or more of the flags shall be set according to the subscribed charging characteristics received from the HLR as part of the packet domain subscription data.~~



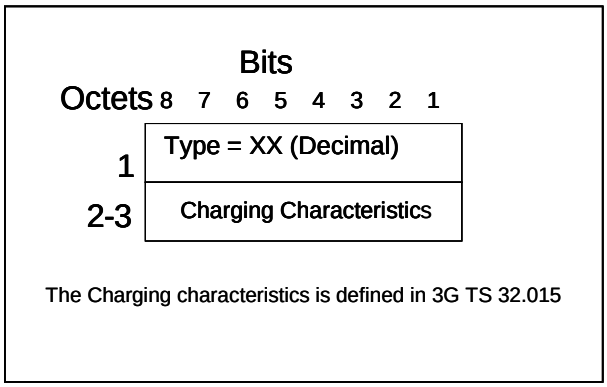


Figure 30: Charging Characteristics information element