

Source: TSG CN WG 2
Title: CRs to R99 Work Item CAMEL3, 29.078
Agenda item: 7.2
Document for: APPROVAL

Introduction:

This document contains 14 CRs on R99 Work Item "CAMEL3", that have been agreed by TSG CN WG2, and are forwarded to TSG CN Plenary meeting #10 for approval.

SPEC	CR	REV	TDoc	PHASE	SUBJECT	CAT	OLD VER
29.078	118	3	N2-000559	R99	Correction on CAMEL CF and OR	F	3.5.0
29.078	119		N2-000459	R99	Correction of Cause and GPRSCause	F	3.5.0
29.078	121	1	N2-000519	R99	Correction to CAP3 GPRS-cause	F	3.5.0
29.078	122	2	N2-000551	R99	CAMEL3 removal of duplicate RAI	F	3.5.0
29.078	123		N2-000485	R99	Editorial replacement of TCAP by TC	D	3.5.0
29.078	124	1	N2-000515	R99	Editorial corrections to stage 3	D	3.5.0
29.078	125	1	N2-000516	R99	Corrections of the stage 3 inconsistencies	F	3.5.0
29.078	126		N2-000508	R99	" ElapsedTime" ASN.1 Type Correction (in ACR-GPRS)	F	3.5.0
29.078	127	1	N2-000518	R99	CAMEL3 ASN.1 reserved word "ms" replacement by "mobile"	F	3.5.0
29.078	128	3	N2-000675	R99	Correction of Apply Charging Report parameter definition	F	3.5.0
29.078	130	1	N2-000644	R99	Addition of a parameter to indicate the SAI	F	3.5.0
29.078	131		N2-000605	R99	Correction of Apply Charging Report GPRS definition	F	3.5.0
29.078	135	1	N2-000653	R99	Introduction of GGSN Address	F	3.5.0
29.078	136	1	N2-000671	R99	Introduction of ellipsis for GPRS CAPv3	F	3.5.0

CHANGE REQUEST

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29.078 CR 119

Current Version: **3.5.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG CN#10**
list expected approval meeting # here ↑

for approval
for information

strategic
non-strategic (for SMG 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 UTRAN / Radio Core Network

Source: Siemens **Date:** 9 October 2000

Subject: Correction of Cause and GPRSCause

Work item: CAMEL Phase 3

Category: <i>(only one category shall be marked with an X)</i>	F Correction	<input checked="" type="checkbox"/>	Release:	Phase 2	<input type="checkbox"/>
	A Corresponds to a correction in an earlier release	<input type="checkbox"/>		Release 96	<input type="checkbox"/>
	B Addition of feature	<input type="checkbox"/>		Release 97	<input type="checkbox"/>
	C Functional modification of feature	<input type="checkbox"/>		Release 98	<input type="checkbox"/>
	D Editorial modification	<input type="checkbox"/>		Release 99	<input checked="" type="checkbox"/>
			Release 00	<input type="checkbox"/>	

Reason for change:

Cause	For unified treatment of the value of the minimum and the maximum length, the minimum length is proposed to be defined as "&minCauseLength".
GPRSCause	For flexible handling for the future change, the minimum and the maximum length of this value are proposed to be defined as "&minGPRSCauseLength" and "&maxGPRSCauseLength" respectively.

Clauses affected:

Other specs affected:

Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:	
Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:	
MS test specifications	<input type="checkbox"/>	→ List of CRs:	
BSS test specifications	<input type="checkbox"/>	→ List of CRs:	
O&M specifications	<input type="checkbox"/>	→ List of CRs:	

Other comments:

***** First change in the clause 5.1 Data Types *****

```

Cause {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
  bound.&minCauseLength .. bound.&maxCauseLength))
-- Indicates the cause for interface related information.
-- Refer to ETS 300 356-1 [8] Cause parameter for encoding.
-- For the use of cause and location values refer to ITU-T Recommendation Q.850 [22]
-- Shall always include the cause value and shall also include the diagnostics field,
-- if available.

GPRSCause {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(1bound.&minGPRSCauseLength
  .. bound.&maxGPRSCauseLength))
-- Indicates the cause for interface related information.
-- Refer to 3G TS 29.060 [43] Cause parameter for encoding.
-- Shall only include the cause value.

```

***** Next change in the clause 5.1 Data Types *****

```

-- The Definition of range of constants follows
minCauseLength INTEGER ::= 2
numOfInfoItems INTEGER ::= 4

```

***** Next change in the clause 5.5 Classes *****

```

PARAMETERS-BOUND ::= CLASS
{
  &minAccessPointNameLength          INTEGER,
  &maxAccessPointNameLength          INTEGER,
  &minAChBillingChargingLength        INTEGER,
  &maxAChBillingChargingLength        INTEGER,
  &minAttributesLength                INTEGER,
  &maxAttributesLength                INTEGER,
  &maxBearerCapabilityLength          INTEGER,
  &minCalledPartyBCDNumberLength      INTEGER,
  &maxCalledPartyBCDNumberLength      INTEGER,
  &minCalledPartyNumberLength         INTEGER,
  &maxCalledPartyNumberLength         INTEGER,
  &minCallingPartyNumberLength        INTEGER,
  &maxCallingPartyNumberLength        INTEGER,
  &minCallResultLength                INTEGER,
  &maxCallResultLength                INTEGER,
  &minCarrierLength                   INTEGER,
  &maxCarrierLength                   INTEGER,
  &minCauseLength                     INTEGER,
  &maxCauseLength                     INTEGER,
  &minDigitsLength                    INTEGER,
  &maxDigitsLength                    INTEGER,
  &minFCIBillingChargingDataLength    INTEGER,
  &maxFCIBillingChargingDataLength    INTEGER,
  &minFCIBillingChargingLength        INTEGER,
  &maxFCIBillingChargingLength        INTEGER,
  &minGenericNumberLength             INTEGER,
  &maxGenericNumberLength             INTEGER,
  &minGPRSCauseLength                 INTEGER,
  &maxGPRSCauseLength                 INTEGER,
  &minIPSSPCapabilitiesLength         INTEGER,
  &maxIPSSPCapabilitiesLength         INTEGER,
  &minLocationNumberLength            INTEGER,
  &maxLocationNumberLength            INTEGER,
  &minMessageContentLength            INTEGER,
  &maxMessageContentLength            INTEGER,
  &minOriginalCalledPartyIDLength     INTEGER,
  &maxOriginalCalledPartyIDLength     INTEGER,
  &minPDPAddressLength                INTEGER,

```

```

&maxPDPAddressLength          INTEGER,
&minRedirectingPartyIDLength  INTEGER,
&maxRedirectingPartyIDLength  INTEGER,
&minScfIDLength               INTEGER,
&maxScfIDLength               INTEGER,
&minSCIBillingChargingLength  INTEGER,
&maxSCIBillingChargingLength  INTEGER,
&minTimeAndTimezoneLength     INTEGER,
&maxTimeAndTimezoneLength     INTEGER,
&numOfBCSMEvents              INTEGER,
&numOfSMSEvents               INTEGER,
&numOfGPRSEvents              INTEGER,
&numOfExtensions              INTEGER,
&numOfGenericNumbers           INTEGER,
&numOfMessageIDs              INTEGER
}

WITH SYNTAX
{
MINIMUM-FOR-ACCESS-POINT-NAME          &minAccessPointNameLength
MAXIMUM-FOR-ACCESS-POINT-NAME          &maxAccessPointNameLength
MINIMUM-FOR-ACH-BILLING-CHARGING       &minAChBillingChargingLength
MAXIMUM-FOR-ACH-BILLING-CHARGING       &maxAChBillingChargingLength
MINIMUM-FOR-ATTRIBUTES                 &minAttributesLength
MAXIMUM-FOR-ATTRIBUTES                 &maxAttributesLength
MAXIMUM-FOR-BEARER-CAPABILITY           &maxBearerCapabilityLength
MINIMUM-FOR-CALLED-PARTY-BCD-NUMBER    &minCalledPartyBCDNumberLength
MAXIMUM-FOR-CALLED-PARTY-BCD-NUMBER    &maxCalledPartyBCDNumberLength
MINIMUM-FOR-CALLED-PARTY-NUMBER        &minCalledPartyNumberLength
MAXIMUM-FOR-CALLED-PARTY-NUMBER        &maxCalledPartyNumberLength
MINIMUM-FOR-CALLING-PARTY-NUMBER        &minCallingPartyNumberLength
MAXIMUM-FOR-CALLING-PARTY-NUMBER        &maxCallingPartyNumberLength
MINIMUM-FOR-CALL-RESULT                 &minCallResultLength
MAXIMUM-FOR-CALL-RESULT                 &maxCallResultLength
MINIMUM-FOR-CARRIER                     &minCarrierLength
MAXIMUM-FOR-CARRIER                     &maxCarrierLength
MINIMUM-FOR-CAUSE                       &minCauseLength
MAXIMUM-FOR-CAUSE                       &maxCauseLength
MINIMUM-FOR-DIGITS                      &minDigitsLength
MAXIMUM-FOR-DIGITS                      &maxDigitsLength
MINIMUM-FOR-FCI-BILLING-CHARGING-DATA   &minFCIBillingChargingDataLength
MAXIMUM-FOR-FCI-BILLING-CHARGING-DATA   &maxFCIBillingChargingDataLength
MINIMUM-FOR-FCI-BILLING-CHARGING        &minFCIBillingChargingLength
MAXIMUM-FOR-FCI-BILLING-CHARGING        &maxFCIBillingChargingLength
MINIMUM-FOR-GENERIC-NUMBER              &minGenericNumberLength
MAXIMUM-FOR-GENERIC-NUMBER              &maxGenericNumberLength
MINIMUM-FOR-IP-SSP-CAPABILITIES         &minIPSSPCapabilitiesLength
MAXIMUM-FOR-IP-SSP-CAPABILITIES         &maxIPSSPCapabilitiesLength
MINIMUM-FOR-GPRS-CAUSE-LENGTH           &minGPRSCauseLength
MAXIMUM-FOR-GPRS-CAUSE-LENGTH           &maxGPRSCauseLength
MINIMUM-FOR-LOCATION-NUMBER               &minLocationNumberLength
MAXIMUM-FOR-LOCATION-NUMBER               &maxLocationNumberLength
MINIMUM-FOR-MESSAGE-CONTENT             &minMessageContentLength
MAXIMUM-FOR-MESSAGE-CONTENT             &maxMessageContentLength
MINIMUM-FOR-ORIGINAL-CALLED-PARTY-ID    &minOriginalCalledPartyIDLength
MAXIMUM-FOR-ORIGINAL-CALLED-PARTY-ID    &maxOriginalCalledPartyIDLength
MINIMUM-FOR-PDP-ADDRESS-LENGTH          &minPDPAddressLength
MAXIMUM-FOR-PDP-ADDRESS-LENGTH          &maxPDPAddressLength
MINIMUM-FOR-REDIRECTING-ID              &minRedirectingPartyIDLength
MAXIMUM-FOR-REDIRECTING-ID              &maxRedirectingPartyIDLength
MINIMUM-FOR-GSMSCF-ID                   &minScfIDLength
MAXIMUM-FOR-GSMSCF-ID                   &maxScfIDLength
MINIMUM-FOR-SCI-BILLING-CHARGING        &minSCIBillingChargingLength
MAXIMUM-FOR-SCI-BILLING-CHARGING        &maxSCIBillingChargingLength
MINIMUM-FOR-TIME-AND-TIMEZONE           &minTimeAndTimezoneLength
MAXIMUM-FOR-TIME-AND-TIMEZONE           &maxTimeAndTimezoneLength
NUM-OF-BCSM-EVENT                       &numOfBCSMEvents
NUM-OF-SMS-EVENTS                       &numOfSMSEvents
NUM-OF-GPRS-EVENTS                       &numOfGPRSEvents
NUM-OF-EXTENSIONS                       &numOfExtensions
NUM-OF-GENERIC-NUMBERS                   &numOfGenericNumbers
NUM-OF-MESSAGE-IDS                       &numOfMessageIDs
}

capSpecificBoundSet PARAMETERS-BOUND ::=
{
MINIMUM-FOR-ACCESS-POINT-NAME          1
MAXIMUM-FOR-ACCESS-POINT-NAME          100
MINIMUM-FOR-ACH-BILLING-CHARGING       5
MAXIMUM-FOR-ACH-BILLING-CHARGING       177
MINIMUM-FOR-ATTRIBUTES                 2
MAXIMUM-FOR-ATTRIBUTES                 10
MAXIMUM-FOR-BEARER-CAPABILITY           11
MINIMUM-FOR-CALLED-PARTY-BCD-NUMBER    1
MAXIMUM-FOR-CALLED-PARTY-BCD-NUMBER    41
}

```

MINIMUM-FOR-CALLED-PARTY-NUMBER	3
MAXIMUM-FOR-CALLED-PARTY-NUMBER	18
MINIMUM-FOR-CALLING-PARTY-NUMBER	2
MAXIMUM-FOR-CALLING-PARTY-NUMBER	10
MINIMUM-FOR-CALL-RESULT	12
MAXIMUM-FOR-CALL-RESULT	186
MINIMUM-FOR-CARRIER	4
MAXIMUM-FOR-CARRIER	4
MINIMUM-FOR-CAUSE	2
MAXIMUM-FOR-CAUSE	32
MINIMUM-FOR-DIGITS	2
MAXIMUM-FOR-DIGITS	16
MINIMUM-FOR-FCI-BILLING-CHARGING-DATA	1
MAXIMUM-FOR-FCI-BILLING-CHARGING-DATA	160
MINIMUM-FOR-FCI-BILLING-CHARGING	5
MAXIMUM-FOR-FCI-BILLING-CHARGING	172
MINIMUM-FOR-GENERIC-NUMBER	3
MAXIMUM-FOR-GENERIC-NUMBER	11
MINIMUM-FOR-IP-SSP-CAPABILITIES	1
MAXIMUM-FOR-IP-SSP-CAPABILITIES	4
MINIMUM-FOR-GPRS-CAUSE-LENGTH	1
MAXIMUM-FOR-GPRS-CAUSE-LENGTH	1
MINIMUM-FOR-LOCATION-NUMBER	2
MAXIMUM-FOR-LOCATION-NUMBER	10
MINIMUM-FOR-MESSAGE-CONTENT	1
MAXIMUM-FOR-MESSAGE-CONTENT	127
MINIMUM-FOR-ORIGINAL-CALLED-PARTY-ID	2
MAXIMUM-FOR-ORIGINAL-CALLED-PARTY-ID	10
MINIMUM-FOR-PDP-ADDRESS-LENGTH	1
MAXIMUM-FOR-PDP-ADDRESS-LENGTH	63
MINIMUM-FOR-REDIRECTING-ID	2
MAXIMUM-FOR-REDIRECTING-ID	10
MINIMUM-FOR-GSMSCF-ID	2
MAXIMUM-FOR-GSMSCF-ID	10
MINIMUM-FOR-SCI-BILLING-CHARGING	4
MAXIMUM-FOR-SCI-BILLING-CHARGING	69
MINIMUM-FOR-TIME-AND-TIMEZONE	8
MAXIMUM-FOR-TIME-AND-TIMEZONE	8
NUM-OF-BCSM-EVENT	10
NUM-OF-SMS-EVENTS	10
NUM-OF-GPRS-EVENTS	10
NUM-OF-EXTENSIONS	10
NUM-OF-GENERIC-NUMBERS	5
NUM-OF-MESSAGE-IDS	16
}	
END	

CHANGE REQUEST

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

29.078 CR 123

Current Version: **3.5.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG CN#10**
 list expected approval meeting # here ↑

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 for information

strategic
 non-strategic (for SMG use only)

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

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

Source: Nokia **Date:** 9 Oct 2000

Subject: Editorial replacement of *TCAP* by *TC*

Work item: CAMEL phase 3

Category: 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 Release 98
 D Editorial modification Release 99
 Release 00
 (only one category shall be marked with an X)

Reason for change: In Seattle CN2 meeting we agreed to replace *TCAP* by *TC* for consistency. The replacement is done in Stage 3 only; the effort in Stage 2 does not seem to justify the effort, especially in the SDL figures. Basically, the TCAP means the same as TC and the TC is more appropriate.

Clauses affected:

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

Other comments:

2.1 Specifications used for IMPORTs for CAP

The following table lists the modules from which CAP V3 imports. For each module, the table indicates in which formal specification this module can be found.

Note to MCC: I have added the Table heading and I have corrected the table style.

Table 2-1: Module IMPORT specifications

Module Name	Specification	Ref
CS1-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3) cs1-datatypes(2) version1(0)}	ETS 300 374-1	[9]
CS2-datatypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3) in-cs2-datatypes (0) version1(0)}	EN 301 140-1	[39]
MAP-CommonDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) gsm-network(1) modules(3) map-CommonDataTypes(18) version6(6)}	3G TS 29.002	[13]
MAP-MS-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) gsm-network(1) modules(3) map-MS-DataTypes(11) version6(6)}	3G TS 29.002	[13]
MAP-CH-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) gsm-network(1) modules(3) map-CH-DataTypes(13) version6(6)}	3G TS 29.002	[13]
TCAP Messages {ccitt recommendation q 773 modules(2) messages(1) version3(3)}	ITU-T Q.773	[48]
Remote-Operations-Information-Objects {joint-iso-ccitt remote-operations(4) informationObjects(5) version1(0)}	ITU-T X.880	[37]
TC-Notation-Extensions {ccitt recommendation q 775 modules(2) notation-extension (4) version1(1)}	ETS 300 287-1	[6]

**** NEXT MODIFIED SECTION ****

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

....

TC	Transaction Capabilities
TCAP	Transaction Capabilities Application Part

....

4 Interface specification for telecommunication services

4.1 General

4.1.1 Definition methodology

...

The CAMEL Application Protocol (CAP) is a ROS Element (ROSE) user protocol (see CCITT Recommendation X.219 [31] and CCITT Recommendation X.229 [32]). The ROSE protocol is contained within the component sublayer of **Transaction Capabilities Application Part (TCAP)** (see ETS 300 287-1) and Digital Subscriber Signalling System No One (DSS1) (ITU-T Recommendation Q.932). At present the ROSE Application Protocol Data Units (APDUs) are conveyed in transaction sublayer messages in Signalling System no. 7 (SS7) and in the EN 300 403-1 REGISTER, FACILITY and call control messages in DSS1. Other supporting protocols may be added at a later date.

...

**** NEXT MODIFIED SECTION ****

4.2.1 Reflection of TCAPTC AC

TCAPTC AC negotiation rules require that the proposed AC, if acceptable, is reflected in the first backwards message.

If the AC is not acceptable, and the TC-User does not wish to continue the dialogue, it may provide an alternate AC to the initiator which can be used to start a new dialogue.

NOTE: If the gsmSSF provides an AC which is not acceptable to the gsmSCF, then an alternate AC shall not be returned. If the AC presented to the gsmSCF is not acceptable then this is most probably due to an error in subscriber data provisioning or an error at the gsmSSF.

Refer to EN 300 287 [6] for a description of the TCAPTC AC negotiation mechanism.

**** NEXT MODIFIED SECTION ****

5 Common CAP Types

5.1 Data types

-- The Definition of Common Data Types follows

....

```
tc-Messages,
classes
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

TCInvokeldSet
FROM TCAPMessages tc-Messages
```

**** NEXT MODIFIED SECTION ****

5.6 Object Identifiers (IDs)

...

```
| -- For Modules from TCAPTC, ROS,  
tc-Messages OBJECT IDENTIFIER ::=  
  {ccitt recommendation q 773 modules(2) messages(1) version3(3)}  
tc-NotationExtensions OBJECT IDENTIFIER ::=  
  {ccitt recommendation q 775 modules(2) notation-extension (4) version1(1)}  
ros-InformationObjects OBJECT IDENTIFIER ::=  
  {joint-iso-ccitt remote-operations(4) informationObjects(5) version1(0)}
```

**** NEXT MODIFIED SECTION ****

5.65.x User Abort Data

<CR editor's note: this the second chapter 5.6. In addition, the automatic section numbering shall be removed>

```
CAP-U-ABORT-Data {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-Network(1)
modules(3) cap-u-abort-data(110) version3(2)}
```

```
DEFINITION ::= BEGIN
```

```
id-CAP-U-ABORT-Reason OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0)
mobileDomain(0) umts-Network(1) AS(1) cap-u-abort-reason(2) version3(2)}
```

```
cAP-U-ABORT-Reason-Abstract-Syntax ABSTRACT-SYNTAX ::= {CAP-U-ABORT-REASON IDENTIFIED BY
id-CAP-U-ABORT-Reason}
```

```
CAP-U-ABORT-REASON ::= ENUMERATED {
  no-reason-given(1),
  application-timer-expired(2),
  not-allowed-procedures(3),
  abnormal-processing(4),
  congestion(5),
  invalid-reference(6),
  missing-reference (7),
  overlapping-dialogue (8)
}
```

```
-- application-timer-expired shall be set when application timer (e.g. Tssf ) is expired.
-- not-allowed-procedures shall be set when received signal is not allowed in CAP
-- procedures.
-- For example, when class4 operation is received from SCF and
-- the operation is not allowed in SSF FSM.
-- (SSF FSM cannot continue state transition). (e.g. ReleaseCall
-- operation received in Waiting for End of Temporary Connection
-- state.)
-- abnormal-processing shall be set when abnormal procedures occur at entity action.
-- congestion shall be set when requested resource is unavailable due to
-- congestion at TC user (CAP) level.
-- invalid-reference shall be set if the received destinationReference is unknown or
-- for a known destination Reference the received originationReference
-- does not match with the stored originationReference.
-- missing-reference This abort reason is used for CAP defined GPRS-ReferenceNumber.
-- shall be set when the destinationReference or the
-- originationReference is absent in the received message but is
-- required to be present according to the procedures in 12.1.7.
-- This abort reason is used for CAP defined GPRS-ReferenceNumber.
-- overlapping-dialogue shall be used by the gprsSSF to indicate to the gsmSCF that a
-- specific instance already has a TCAPTC dialogue open. This error
-- cause is typically obtained when both the gsmSCF and gprsSSF
-- open a new dialogue at the same time.
-- no-reason-given shall be set when any other reasons above do not apply
END -- of CAP-U-ABORT-Data
```

**** NEXT MODIFIED SECTION ****

6.1.2 gsmSSF/gsmSCF packages, contracts and ACs

6.1.2.1 gsmSSF/gsmSCF ASN.1 module

...

```
TCMessage {}  
FROM TCAPMessages tc-Messages
```

**** NEXT MODIFIED SECTION ****

6.2.2 gsmSRF/gsmSCF contracts, packages and ACs

6.2.2.1 gsmSRF/gsmSCF ASN.1 modules

...

```
TCMessage {}  
FROM TCAPMessages tc-Messages  
  
APPLICATION-CONTEXT,  
dialogue-abstract-syntax  
FROM TC-Notation-Extensions tc-NotationExtensions
```

**** NEXT MODIFIED SECTION ****

7.2 SMS contracts, packages and ACs

7.2.1 SMS ASN.1 module

....

```
TCMessage {}  
FROM TCAPMessages tc-Messages  
  
APPLICATION-CONTEXT,  
dialogue-abstract-syntax  
FROM TC-Notation-Extensions tc-NotationExtensions
```


**** NEXT MODIFIED SECTION ****

8.2 gsmSCF/gprsSSF contracts, packages and ACs

8.2.1 gprsSSF/gsmSCF ASN.1 module

....

```
TCMessage {}  
FROM TCAPMessages tc-Messages  
  
APPLICATION-CONTEXT,  
dialogue-abstract-syntax  
FROM TC-Notation-Extensions tc-NotationExtensions
```

10 Error procedures

This clause defines the generic error procedures for the CAP. The error procedure descriptions have been divided in two subclauses, subclause 10.1 listing the errors related to CAP operations and subclause 10.2 listing the errors related to error conditions in the different FEs which are not directly related to the CAP operations.

The gsmSSF states which are referred to in this clause are described in 3G TS 23.078 [42]. The operations PlayAnnouncement, PromptAndCollectUserInformation and SpecialisedResourceReport refer to states in the gsmSRF SRSM which are described in ETS 300 374-1 [9] as well as to states in 3G TS 23.078 [42].

10.1 Operation related error procedures

The following subclauses define the generic error handling for the operation related errors. The errors are defined as operation errors in subclauses 6, 7 and 8. Errors which have a specific procedure for an operation are described in subclause 11 with the detailed procedure of the related operation.

The ~~TCAP~~TC services which are used for reporting operation errors are described in subclause 12.1. All errors, which can be detected by the ASN.1 decoder, already may have been detected during the decoding of the ~~TCAP~~TC message and indicated by the TC error indication "MistypedParameter" in the TC-U-Reject.

**** NEXT MODIFIED SECTION ****

10.2 Entity related error procedures

The following subclauses define the error handling for the entity related errors. Since the error situations are not originated by the reception of an operation, the invoking entity is denoted here as the entity at which the error situation is detected. The responding entity is the entity which receives the error report.

The ~~TCAP~~TC services used for reporting errors are described in clause 12.

11 Detailed operation procedures

...

11.1.2 Responding entity (gsmSSF, gsmSRF or assistSSF)

11.1.2.1 Normal procedure

gsmSSF/gsmSRF/assistSSF precondition:

- (1) A relationship exists between the gsmSCF and the gsmSSF/gsmSRF/assistSSF
- (2) The SSME FSM is in the state "Idle Management"

gsmSSF/assistSSF postcondition:

- (1) The SSME-FSM stays in, or moves to the state "Non-call Associated Treatment".
- (2) If the Dialogue ID is active and if there is a gsmSSF/assistSSF using the dialogue, the SSME sends a Return Result "ActivityTest" to the gsmSCF. The SSME-FSM returns to the state "Idle Management".

If the Dialogue ID is not active, the TC in the gsmSSF/assistSSF will issue a P-Abort, the SSME will in that case never receive the "ActivityTest" req.ind and thus will not be able to reply.

gsmSRF postconditions

- (1) If the dialogue ID is active and if there is a gsmSRF using the dialogue, the SSME sends a return result "ActivityTest" to the gsmSCF.

If the dialogue ID is not active, the TC in the gsmSRF will issue a P-Abort, the SSME will in that case never receive the ActivityTest operation and thus will not be able to reply.

**** NEXT MODIFIED SECTION ****
--

11.2.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.3.2.2 Error handling

TaskRefused: In addition to the generic error handling noted below, this error shall be indicated when:

- a previously received call period duration is pending,
- a tariffSwitchInterval is indicated when a previously received tariffSwitchInterval is pending.

Generic error handling for the operation related errors is described in clause 10 and the TCAP services used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.4.2.2 Error handling

TaskRefused: In addition to the generic error handling noted below, this error shall be indicated when:

- a previously received GPRS session or PDP context period or volume duration is pending;
- a tariffSwitchInterval is indicated when a previously received tariffSwitchInterval is pending.

Generic error handling for the operation related errors is described in clause 10 and the TCAP services used for reporting operation errors are described in clause 12.

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

11.6.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****
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11.12.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****
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11.14.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****
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11.15.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

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

11.22.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****
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11.25.2.2 Error handling

In case the message type is request, on expiration of T_{SSF} before receiving any operation, the gprsSSF aborts the interaction with the gsmSCF and instructs the SGSN to handle the GPRS session or PDP context according to the default GPRS handling parameters of the valid CSI.

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

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

11.28.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.29.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

11.31.2 Invoking entity (gprsSSF)

11.31.2.1 Normal procedure

gprsSSF preconditions:

- (1) An event has been met that is armed as TDP.
- (2) There is no GPRS dialogue active for that PDP Context or for the GPRS Session.gprsSSF postcondition:

- (1) A control relationship has been established and the gprsSSF is in state "waiting for instructions".

The address of the gsmSCF that the InitialDPGPRS operation shall be sent to is fetched from the valid CSI. The gprsSSF provides all available parameters.

The gprsSSF shall memorise the address of the response message and use it in the future TCAP dialogues.

A control relationship is established with the gsmSCF. The gprsSSF application timer T_{SSF} is set when the gprsSSF sends InitialDPGPRS for requesting instructions from the gsmSCF. It is used to prevent from excessive GPRS session or PDP context duration or volume usage.

11.31.2.2 Error handling

If the destination gsmSCF is not accessible then the gprsSSF instructs the SGSN to handle the GPRS session or PDP context according to the Default GPRS handling parameter of the valid CSI.

On expiration of T_{SSF} before receiving any operation, the gprsSSF aborts the interaction with the gsmSCF and instructs the SGSN to handle the call according to the Default GPRS handling parameter of the valid CSI.

If the MS abandons the establishment of a GPRS session or PDP context after the sending of InitialGPRSEvent, then the gprsSSF aborts the control relationship after the first response from the gsmSCF has been received.

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.32.2.2 Error handling

If the destination gsmSCF is not accessible then the gsmSSF/gprsSSF instructs the MSC/SGSN to handle the SM according to the Default SMS Handling parameter of the SMS-CSI.

On expiration of T_{SSF} before receiving any operation, the gsmSSF/gprsSSF aborts the interaction with the gsmSCF and instructs the VMSC/SGSN to handle the SM according to the Default SMS Handling parameter of the SMS-CSI.

If the sending mobile party abandons after the sending of InitialDPSMS, then the gsmSSF/gprsSSF closes the control relationship after the first answer message from the gsmSCF has been received, and after the SMSC has responded or a timer has expired.

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.36.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****

11.39.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

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

11.40.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

**** NEXT MODIFIED SECTION ****
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11.42.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TCAP services which are used for reporting operation errors are described in clause 12.

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

11.44.2.1 Normal procedure

gsmSSF precondition:

- (1) gsmSSF State "Waiting for Instructions", or
gsmSSF State "Waiting for End of User Interaction", or
gsmSSF State "Waiting for End of Temporary Connection", or
gsmSSF State "Monitoring".

gsmSSF postcondition:

- (1) No FSM state transition

On receipt of this operation the gsmSSF performs actions to send the advice of charge information to the indicated Call Party's MS.

If advice of charge is to be provided to a GSM MS in conjunction with CSE control of call duration then the following sequence of operations shall be sent from the gsmSCF to the gsmSSF in the following order, in the same ~~TCAP~~TC-CONTINUE component;

ApplyCharging; SendChargingInformation

These operations will be processed sequentially by the gsmSSF, in the order that they are sent by the gsmSCF. Note also that in this case parameter TariffSwitchInterval may be present in either in the ApplyCharging operation or the SendChargingInformation operation, but not in both operations. It is recommended that it shall be transported in the ApplyCharging operation.

The TariffSwitchInterval information received with either of these operations shall set the same tariff switch timer in the gsmSSF, and this duration timer shall run from the time of successful operation execution.

11.44.2.2 Error handling

TaskRefused: In addition to the generic error handling noted below, this error shall be indicated when:

- a tariffSwitchInterval is indicated when a previously received tariffSwitchInterval is pending.

Generic error handling for the operation related errors are described in clause 10 and the TC services which are used for reporting operation errors are described in clause 12.

11.45.2 Responding Entity (gprsSSF)

11.45.2.1 Normal Procedure

gprsSSF preconditions:

- (1) A control relationship exist between the gsmSCF and the GPRS Session or PDP Context.

The gprsSSF FSM is in state "Waiting for Instructions" or in state "Monitoring".

gprsSSF postconditions:

- (1) No state transition.

On receipt of this operation the gprsSSF performs actions to send the advice of charge information to the MS, provided Advice Of Charge is supported by the SGSN.

If advice of charge is to be provided to a GSM MS in conjunction with CSE control of GPRS session or PDP context duration or volume, then the following sequence of operations shall be sent from the gsmSCF to the gprsSSF in the following order and in the same ~~TCAP~~ TC-CONTINUE or TC-BEGIN component:

ApplyChargingGPRS; SendChargingInformationGPRS.

These operations will be processed sequentially by the gprsSSF, in the order that they are sent by the gsmSCF. Note also that in this case parameter TariffSwitchInterval may be present in either in the ApplyChargingGPRS operation or the SendChargingInformationGPRS operation, but not in both operations. It is recommended that it shall be transported in the ApplyGPRSCharging operation.

The TariffSwitchInterval information received with either of these operations shall set the same tariff switch timer in the gprsSSF, and this duration timer shall run from the time of successful operation execution.

11.45.2.2 Error handling

TaskRefused: In addition to the generic error handling noted below, this error shall be indicated when:

- a tariffSwitchInterval is indicated when a previously received tariffSwitchInterval is pending.

Generic error handling for the operation related errors is described in clause 10 and the ~~TCAP~~ services which are used for reporting operation errors are described in clause 12.

12 Services assumed from lower layers

12.1 Services assumed from ~~TCAP~~TC

The SS7 application layer protocol defined in this 3G TS, is a protocol to provide communication between a pair of application processes. In the SS7 environment this is represented as communication between a pair of application-entities (AEs) using the TC. The function of an AE is provided by a set of application-service-elements (ASEs). The interaction between AEs is described in terms of their use of the services provided by the ASEs.

If AC are to be used for FE differentiation within a physical node then the version of TC used must support the dialogue portion of TC (ie ETS 300 287-1 [6]).

This requirement applies to all interfaces, not just those used for internetworking.

Table 12-1 defines which versions of TC are the minimum versions required to support the defined CAP interfaces:

Table 12-1: Minimum TC requirements for CAP interfaces

Interface	IN CS2
gsmSSF - gsmSCF	Blue Book (note)
gsmSCF - gsmSRF	Blue Book (note)
Note: If the AC name needs to be indicated, then ETS 300 287-1 [6] is the minimum version required.	

12.1.1 Common procedures

This subclause defines the procedures and mapping which apply between CAP and TC to be used in the absence of specific procedures and mapping instructions for the specific CAP interfaces as defined in subsequent subclauses.

12.1.1.1 Normal procedures

This subclause describes the procedures and ~~TCAP~~TC primitives that shall be used for transmitting messages between AEs under normal operation.

The CAP, as TC-user, uses only the structured dialogue facility provided by ~~TCAP~~TC. The following situations can occur when a message is sent between two PE:

- a dialogue shall be established: the TC-user issues a TC-BEGIN request primitive.
- a dialogue shall be maintained: the TC-user issues a TC-CONTINUE request primitive.
- a dialogue shall no longer be maintained: the TC-user issues a TC-END request primitive with either basic end or with pre-arranged end depending on the following conditions:
 - Basic End
 - In the case the dialogue is established, operations, leading to a termination of the relationship, can be transmitted by the FE with a TC-END request primitive (basic) in case the FE is not interested in the reception of any ERROR or REJECT components for these sent operations. Once the FE dialogue resources have been released, any ERROR or REJECT components received for these operations will be discarded by TC as described in ETS 300 287-1 [6].
 - In case the dialogue is established and the FE has received an operation, leading to the termination of the relationship, does not wish to continue dialogue and there is no operation to be sent, a TC-END request primitive (basic) with zero components can be sent from the FE.
 - Pre-arranged End

- Where an entity is interested in possible ERROR or REJECT messages on response to sent operations leading to a termination of the relationship, the dialogue is ended with a TC-END request primitive (pre-arranged end) after the last associated operation timer expires. The receiving entity can end the dialogue with a TC-END request primitive (pre-arranged end) after successful processing of these operations (i.e. the relationship is terminated).
- in general, the use of prearranged end shall be limited to the case for both communicating entities clearly recognizable that peer entity applies prearranged end. In all other cases, basic end shall be used.

12.1.1.2 Abnormal procedures

This subclause describes the procedures and ~~TCAP~~TC primitives that shall be used for reporting abnormal situations between AEs. The error cases are defined in clause 10.

The following primitives shall be used to report abnormal situations:

- operation errors, as defined in the CAP, are reported with TC-U-ERROR request primitive.
- rejection of a ~~TCAP~~TC component by the TC-user shall be reported with TC-U-REJECT request primitive.
- when the FE detecting error or rejecting operation decides the termination of TC dialogue, TC-END request primitive (basic) with error or reject can be used for the termination of TC dialogue.
- when the gsmSSF or the gsmSRF detecting error or rejecting operation recognizes the possibility to continue dialogue, TC-CONTINUE request primitive with error or reject can be used for the continuation of TC dialogue.
- a dialogue shall be aborted by the TC-user with a TC-U-ABORT request primitive.
- on expiration of application timer TSSF or TSRF, dialogue shall be terminated by means of by TC-U-ABORT primitive with an Abort reason, regardless of ~~TCAP~~TC dialogue is established or not.

For abnormal situations detected by ~~TCAP~~TC the same rules shall apply for reception of TC-R-REJECT indication as for transmission of TC-U-REJECT request and for transmission of TC-P-ABORT indication as for transmission of TC-U-ABORT request primitive.

The following rules shall be applied to terminate the ~~TCAP~~TC dialogue under abnormal situations:

- in the case that abort condition is detected and ~~TCAP~~TC dialogue is established, ~~TCAP~~TC dialogue is terminated by TC-U-ABORT primitive with an Abort reason.
- in the case that abort condition is detected and ~~TCAP~~TC dialogue is not established, ~~TCAP~~TC dialogue is locally terminated by TC-U-ABORT primitive. (in the case such as application time out).

In error situations prearranged end shall not be used to terminate the ~~TCAP~~TC dialogue. In case any AE encounters an error situation the peer entity shall be explicitly notified of the error, if possible. If from any entity's point of view the error encountered requires the relationship to be ended, it shall close the dialogue via a TC-END request primitive with basic end or via a TC-U-ABORT request primitive, depending on whether any pending ERROR or REJECT component is to be sent or not.

In case an entity receives a TC-END indication primitive and after all components have been considered, the FSM is not in a state to terminate the relationship, an appropriate internal error should be provided.

In cases when a dialogue needs to be closed by the initiating entity before its establishment has been completed (before the first TC indication primitive to the TC-BEGIN request primitive has been received from the responding entity), the TC-user shall issue a TC-END request primitive with prearranged end or a TC-U-ABORT request primitive. The result of these primitives will be only local, any subsequent TC indication received for this dialogue will be handled according to the abnormal procedures as specified in ETS 300 287-1 [6]).

12.1.1.3 Dialogue handling

12.1.1.3.1 Dialogue establishment

The establishment of a CAP dialogue involves two application processes as described in clause 1, one that is the dialogue-initiator and one that is the dialogue-responder.

AC negotiation may not be supported in all PE and/or all networks.

This procedure is driven by the following signals:

- A TC-BEGIN request primitive from the dialogue-initiator.
- A TC-BEGIN indication primitive occurring at the responding side
- The first TC-CONTINUE indication primitive occurring at the initiating side or under specific conditions:
 - A TC-END indication primitive occurring at the initiating side
 - A TC-U-ABORT indication primitive occurring at the initiating side
 - A TC-P-ABORT indication primitive occurring at the initiating side

Sending of a TC-BEGIN request

Before issuing a TC-BEGIN request primitive, TC-USER shall store the AC-name and if present the user-information parameter.

TC-USER shall request the invocation of the associated operations using the TC-INVOKE service. See subclause 12.1.1.4.1 for a description of the invocation procedure.

After processing of the last invocation request, TC-USER shall issue a TC-BEGIN request primitive.

The initiator TC-USER then waits for a TC indication primitive and will not issue any other requests, except a TC-U-ABORT request or a TC-END request with the release method parameter set to "pre-arranged release".

Receipt of a TC-BEGIN indication

On receipt of a TC-BEGIN indication primitive, responder TC-USER shall:

- Analyse the application-context-name if included in the primitive. If it is supported, process any other indication primitives received from TC as described in subclause 12.1.1.4.1.
- If the application-context-name included in the primitive is not supported, issue a TC-U-ABORT request primitive.

Receipt of the first TC-CONTINUE indication

On receipt of the first TC-CONTINUE indication primitive for a dialogue, TC-USER shall check the value of the application-context-name parameter. If this value matches the one used in the TC-BEGIN request primitive, TC-USER shall process the following TC component handling indication primitives as described in subclause 12.1.1.4.1, otherwise it shall issue a TC-U-ABORT request primitive.

Receipt of a TC-END indication

On receipt of a TC-END indication primitive in the dialogue initiated state, TC-USER shall check the value of the application-context-name parameter. If this value match the one used in the TC-BEGIN request primitive, then the TC-USER shall process the following TC component handling indication primitives as described in subclause 12.1.1.4.1.

Receipt of a TC-U-ABORT indication

Receipt of a TC-U-ABORT indication primitive is described as part of user abort procedure (see 12.1.1.3.4.)

Receipt of a TC-P-ABORT indication

Receipt of a TC-P-ABORT indication primitive is described as part of provider abort procedure (see 12.1.1.3.5.)

12.1.1.3.2 Dialogue continuation

Once established the dialogue is said to be in a continuation phase.

Both application processes can request the transfer of CAP APDUs until one of them requests the termination of the dialogue.

Sending entity

TC-USER shall process any component handling request primitives as described in subclause 12.1.1.4.1.

After processing the last component handling request primitive, TC-USER shall issue a TC-CONTINUE request primitive.

Receiving entity

On receipt of a TC-CONTINUE indication primitive TC-USER shall accept zero, one or several TC component handling indication primitives and process them as described in subclause 12.1.1.4.1.

12.1.1.3.3 Dialogue termination

Both the dialogue-initiator and the dialogue-responder have the ability to request the termination of a dialogue after it has been established when no dialogue is to be established or when a dialogue is no longer to be maintained according to the rules as stated in subclauses 12.1.2.1.1 and 12.1.2.1.2.

The dialogue termination procedure is driven by the following events:

- A TC-END request primitive
- A TC-END indication primitive

Sending of TC-END request

When the dialogue shall no longer be maintained, TC-USER shall process any component handling request primitives as described in subclause 12.1.1.4.1

After processing the last component handling request primitive (if any), TC-USER shall issue a TC-END request primitive with the release method parameter set to "basic end" or "prearranged release", according to the rules as stated in subclauses 12.1.2.1.1 and 12.1.2.1.2.

When no dialogue is to be established, refer to subclauses 12.1.1.3.1.

Receipt of a TC-END indication

On receipt of a TC-END indication primitive, the TC-USER shall accept any component handling indication primitives and process them as described in subclause 12.1.1.4.1.

After processing the last component handling primitive all dialogue related resources are released.

12.1.1.3.4 User abort

Both the dialogue-initiator and the dialogue-responder have the ability to abort a dialogue at any time.

The user abort procedure is driven by one of the following events:

- A TC-U-ABORT request primitive
- A TC-U-ABORT indication primitive

Sending of TC-U-ABORT request

After issuing a TC-U-ABORT request primitive, all dialogue related resources are released.

Receipt of a TC-U-ABORT indication

On receipt of a TC-U-ABORT indication all dialogue related resources are released.

12.1.1.3.5 Provider abort

TC has the ability to abort a dialogue at both the dialogue-initiator side and the dialogue-responder side.

The provider abort procedure is driven by the following event:

- A TC-P-ABORT indication primitive

Receipt of a TC-P-ABORT indication

On receipt of a TC-P-ABORT indication, all dialogue related resources are released.

12.1.1.3.6 Mapping to TC dialogue primitives

The TC-UNI service is not used by CAP.

The mapping of parameters onto the TC Dialogue services is as follows:

The use of parameters of the TC-BEGIN service is as defined in subclause 12.1.1.3.7 with the following qualifications:

- The Destination Address parameter of the TC-BEGIN service shall be set to the CAP address of the AE which is to respond to the TC-BEGIN service.

NOTE 1: The address used in this parameter may be mapped by SCCP address translation to one of a number of alternative AEs.

- The AC Name parameter of the TC-BEGIN service shall be set according to the specific interface being used between the initiating AE and the responding AE.
- The Originating Address parameter of the TC-BEGIN service shall be set to the unambiguous CAP address of the AE initiating the TC-BEGIN service.

The use of parameters of the TC-CONTINUE service is as defined in subclause 12.1.1.3.7 with the following qualifications:

- The AC Name parameter of the TC-CONTINUE service shall be set to the value of the AC Name parameter of the TC-BEGIN service for the same Dialogue ID parameter value.
- If present, the Originating Address parameter of the TC-CONTINUE service shall be set to the unambiguous CAP address of the AE initiating the TC-CONTINUE service. This parameter is only present in the first TC-CONTINUE service after a TC-BEGIN service with the same Dialogue ID parameter value.

The use of parameters of the TC-END service is as defined in subclause 12.1.1.3.7 with the following qualifications:

- The AC Name parameter of the TC-END service shall be set to the value of the AC Name parameter of the TC-BEGIN service for the same Dialogue ID parameter value. This parameter is only present if the TC-END service is used immediately after the TC-BEGIN service.

The use of parameters of the TC-U-ABORT service is as defined in subclause 12.1.1.3.7 with the following qualifications:

- The Abort Reason parameter of the TC-U-ABORT service shall be used as specified in ETS 300 287-1 [6].
- The AC Name parameter of the TC-U-ABORT service shall be set to the value used in the TC-BEGIN service.

NOTE 2: This parameter is only present if the TC-U-ABORT is the immediate response to a TC-BEGIN indication.

The use of parameters of the TC-P-ABORT service is as defined in subclause 12.1.1.3.7 with the following qualifications:

- The P-Abort parameter of the TC-P-ABORT service is set by TC to indicate the reason why TC aborted the dialogue. It shall take the values as defined in ETS 300 287-1 [6].

12.1.1.3.7 Default mapping to TC dialogue parameters*Dialogue Id*

The value of this parameter is associated with the CAP invocation in an implementation dependent manner. This parameter uniquely identifies a specific TC dialogue to a remote CAP AE for an CAP AE.

Application-context-name

The application-context-name parameter is set according to the set of operations which need to be supported by the TC dialogue. The defined AC Names can be found in clauses 6 to 8.

User information

This parameter may be used by both initiating and responding application processes. This parameter shall be used for the CAP-GPRS-ReferenceNumber as defined in 12.1.7. For interfaces other than the gprsSSF-gsmSCF interface and for SMS related messages (as in subclauses 12.1.3, 12.1.4 and 12.1.5) the receiving side may ignore this parameter if received. The User Information parameter shall be encoded in accordance with the definition provided in Q.773 (subclause 3.2) [48] and the definition of EXTERNAL type provided in X.690 [34], with the restriction that:

- a size (1..10) constraint of SEQUENCE OF EXTERNAL;
- an Object Identifier shall always be present to identify the user information and the entity which sent it;
- a single-ASN-1-type is used for encoding.

For the use of CAP defined TC-U-Abort reason, see the ASN.1 notation in the subclause 5.7.

For the use of CAP defined CAP-GPRS-ReferenceNumber, see subclause 12.1.7. For the abstract syntax of CAP defined CAP-GPRS-ReferenceNumber, see the ASN.1 notation in the subclause 8.1.

Component present

This parameter is used by TC-USER as described in ETS 300 287-1 [6].

Termination

The value of the release method parameter of the TC-END request primitive is set by TC-USER according to the rules as stated in subclauses 12.1.2.1.1 and 12.1.2.1.2.

Quality of service

The quality of service of TC request primitives is set by the TC-USER to the following value:

- Sequencing requested;
- return option, this parameter is set by TC-USER in an implementation dependent manner.

12.1.1.4 Component handling

12.1.1.4.1 Procedures for CAP operations

This subclause describes the procedures for CAP operations.

Operation invocation

TC-USER shall build an operation argument from the parameters received and request the invocation of the associated operation using the TC-INVOKE procedure. If a linked ID parameter is inserted in the primitive this indicates a child operation and implies that the operation is linked to a parent operation.

Operation invocation receipt

On receipt of a TC-INVOKE indication primitive, TC-USER shall

- If the operation code does not correspond to an operation supported by the application-context, request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (unrecognized operation);
- If a linked ID is included, perform the following checks: If the operation referred to by the linked ID does not allow linked operations or if the operation code does not correspond to a permitted linked operation, or if the parent operation invocation is not active, issue a TC-U-REJECT request primitive with the appropriate problem code (linked response unexpected or unexpected linked operation);

- If the type of the argument is not the one defined for the operation, request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (mistyped parameter);
- if the operation cannot be invoked because the CAP related dialogue is about to be released, requests the transfer of the reject component using the TC-U-REJECT request primitive with the problem code (Initiating Release);
- if sufficient CAP related resources are not available to perform the requested operation, request the transfer of a reject component using the TC-U-REJECT request primitive with the problem code (Resource Limitation);
- Otherwise, accept the TC-INVOKE indication primitive. If the operation is to be user confirmed, TC-USER waits for the corresponding response.

Operation Response

For user confirmed operations, TC-USER shall:

- If no error indication is included in the response to a class 1 or 3 operation, construct a result information element from the parameters received and request its transfer using the TC-RESULT-L service.
- If an error indication is included in the response to a class 1 or 2 operation, construct an error parameter from the parameters received and request its transfer using the TC-U-ERROR request primitive.

Receipt of a response

On receipt of a TC-RESULT-NL indication, TC-USER shall:

- Request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (mistyped parameter).

On receipt of a TC-RESULT-L indication, TC-USER shall:

- if the type of the result parameter is not the one defined for the result of this operation, request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (mistyped parameter);
- otherwise, accept the TC-RESULT-L indication primitive.

On receipt of a TC-U-ERROR indication, TC-USER shall:

- if the error code is not defined for the TC-USER or is not one associated with the operation referred to by the invoke ID, request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (unrecognized error or unexpected error);
- if the type of the error parameter is not the one defined for this error, request the transfer of a reject component using the TC-U-REJECT request primitive, with the appropriate problem code (mistyped parameter);
- Otherwise, accept the TC-U-ERROR indication primitive.

On receipt of a TC-U-REJECT indication primitive which affects a pending operation, TC-USER shall:

- accept the TC-U-REJECT indication primitive.

On receipt of a TC-L-REJECT indicating "return result problem, return error unexpected", TC-USER shall inform the application process.

On receipt of a TC-L-REJECT indicating "return error problem, return error unexpected", TC-USER shall inform the application process.

This event occurs when the local TC detects a protocol error in an incoming component which affects an operation.

When the problem code indicates a general problem, it is considered that the event cannot be related to an active operation even if the invoke Id is provided by TC. This is because it is unclear whether the invoke Id refers to a local or remote invocation. The behaviour of TC-USER in such a case is described in the subclause headed "other events".

On receipt of a TC-L-CANCEL indication, the TC-USER shall:

- if the associated operation is a class 1 operation, inform the application process;

- if the associated operation is a class 2 operation and no linked operations are defined for this operation, ignore the primitive;
- if the associated operation is a class 2 operation and has linked operations but none of them has been invoked, inform the application process;
- if the associated operation is a class 2 operation and a linked operation invocation has already been received in response to this operation, ignore the primitive;
- if the associated operation is a class 3 operation, inform the application process;
- if the associated operation is a class 4 operation, ignore the primitive;

Other events

This subclause describes the behaviour of TC-USER on receipt of a component handling indication primitive which cannot be related to any operation or which does not affect a pending one.

On receipt of a TC-U-REJECT indication primitive which does not affect an active operation (i.e. indicating a return result or return error problem), it is up to the application process to abort, continue or terminate the dialogue, if not already terminated by the sending application process according to the rules as stated in subclause 12.1.2.1.2. This is also applicable for invoke problems related to a class 4 linked operation.

On receipt of a TC-R-REJECT indication (i.e. when a protocol error has been detected by the peer TC entity) which does not affect an active operation, it is up to the application process to abort, continue or terminate the dialogue, if not already terminated by the sending application process according to the rules as stated in subclause 12.1.2.1.2.

On receipt of a TC-L-REJECT indication primitive (i.e. when a protocol error has been detected by the local TC entity) which cannot be related to an active operation, it is up to the application process to continue, or to terminate the dialogue and implicitly trigger the transmission of the reject component or to abort the dialogue.

On receipt of a TC-NOTICE indication primitive, which informs the TC-USER that a message cannot be delivered by the Network Layer, it is for the application process to decide whether to terminate the dialogue or retry.

This primitive can only occur if the Return Option has been set (see subclause 12.1.1.3.6).

12.1.1.4.2 Mapping to TC component primitives

The mapping of parameters onto the TC Component services is as follows:

The TC-U-CANCEL service is not used.

The TC-RESULT-NL service is not used.

The use of parameters of the TC-INVOKE service is as defined in subclause 12.1.1.4.3 with the following qualifications:

- The Operation parameter of the TC-INVOKE service shall contain the *operation.&operationCode* value of the CAP operation to be invoked. The operation must be one of the valid operations supported by the negotiated AC for the TC dialogue and must be invocable by the local AE.
- The Parameters parameter of the TC-INVOKE service shall contain a value of the *operation.&ArgumentType* value for the operation being invoked, as specified by the Operation parameter.

The use of parameters of the TC-RESULT-L service is as defined in subclause 12.1.1.4.3 with the following qualifications:

- The Invoke Id parameter of the TC-RESULT-L service shall be set to the value of the Invoke Id parameter of the TC-INVOKE service from the remote AE to which a result is being sent.
- The Operation parameter of the TC-RESULT-L service be set to the value of the Operation parameter of the TC-INVOKE service from the remote AE which contains the same Invoke Id Parameter value.
- The Parameters parameter of the TC-RESULT-L service shall contain the *operation.&ResultType* value for the operation result, as specified by the Operation parameter.

The use of parameters of the TC-U-ERROR service is as defined in subclause 12.1.1.4.3 with the following qualifications:

- The Invoke Id parameter of the TC-U-ERROR service shall be set to the value of the Invoke Id parameter of the TC-INVOKE service from the remote AE to which an error is being sent.
- The Error parameter of the TC-U-ERROR service shall be set to the value of the *error.&errorCode* of the error to be sent. It must be one of the errors which is expected for the invoked operation as defined in the *operation.&Errors* specification.
- The Parameters parameter of the TC-U-ERROR service shall be set to the value of the *error.&ParameterType* of the error to be sent, as identified by the Error parameter.

The use of parameters of the TC-U-REJECT service is as defined in subclause 12.1.1.4.3 with the following qualifications:

- The Invoke Id parameter of the TC-U-REJECT service shall be set to the Invoke Id Parameter of the TC component service from the remote AE which is being rejected.

The use of parameters of the TC-L-CANCEL service is as defined in subclause 12.1.1.4.3.

12.1.1.4.3 Default mapping to TC component parameters

Invoke Id

This parameter is set by the sending application process. It represents the unique identity of an instance of an operation which is invoked by a AE within a specific TC dialogue. The TC dialogue is identified by the Dialogue Id parameter.

Linked Id

This parameter is set by the sending application process. It represents the Invoke Id of an operation which was received from the remote AE for a specific TC dialogue to which the operation being invoked by the local AE is to be linked. This parameter is only present if the original operation invoked by the remote AE is defined as having linked operations. The type of local operation invoked must be the same type as one of the operations defined as being linked.

Dialogue Id

The value of this parameter is associated with the CAP invocation in an implementation dependent manner. It represents the identity of the established TC dialogue which will carry the component services between the local AE and the remote AE.

Class

The value of this parameter is set according to the type of the operation to be invoked according to the operation definitions in clauses 6 through 8.

Time out

The value of this parameter is set according to the type of operation invoked.

Last component

This parameter is used as described in ETS 300 287-1 [6].

Problem code

This parameter is used as described in subclause 12.1.1.4.1.

Abort reason

This parameter is used by TC-USER, and attributes and coding are specified by network operator.

12.1.2 gsmSSF-gsmSCF interfaces

12.1.2.1 Normal procedures

12.1.2.1.1 gsmSSF-to-gsmSCF messages

This subclause defines the normal procedures for TC messages from the gsmSSF to the gsmSCF.

gsmSSF-FSM related messages

A dialogue shall be established when the gsmSSF-FSM moves from the state **Idle** to the state **WaitingForInstructions**. The InitialDP operation shall be transmitted in the same message.

The CAP operation InitialDP shall be sent with a TC-BEGIN request primitive.

For all other operations sent from the gsmSSF-FSM, the dialogue shall be maintained except for the following cases.

When the gsmSSF-FSM makes a non-error case state transition to the state **Idle** and there is one or more pending operation and TCAPTC dialogue is established, TCAPTC dialogue can be terminated by TC-END primitive with component(s). When the gsmSSF sends the last EventReportBCSM, ApplyChargingReport or CallInformationReport the dialogue may be ended from the gsmSSF by a TC-END request primitive with basic end.

In the case that there is no pending operation and TCAPTC dialogue is established, TCAPTC dialogue can be terminated by TC-END primitive with zero component or prearranged end. When the gsmSSF-FSM makes a non-error case state transition to the state **Idle** and there is no operation to be sent, the dialogue is ended by means of a TC-END request primitive (basic) with zero components, or the dialogue is locally ended by means of a TC-END request primitive with prearranged end.

In the case where a call release is initiated by any other entity than an gsmSCF, the gsmSSF can end a dialogue with a TC-END request primitive with zero component or prearranged end if a TCAPTC dialogue is established and the gsmSSF has no pending call information requests (or pending requests which should be treated in the same way, see subclause 12.1.1.1) nor any armed EDP.

When the gsmSSF has sent the last EventReportBCSM, ApplyChargingReport or CallInformationReport the dialogue may be ended from the gsmSCF by a TC-END request primitive with basic end.

Assisting gsmSSF FSM related messages

A dialogue shall be established when the Assisting gsmSSF-FSM moves from the state **Idle** to the state **Active**. The AssistRequestInstructions operation shall be transmitted with a TC-BEGIN request primitive.

For all other operations sent from the Assisting gsmSSF-FSM, the dialogue shall be maintained except for the following cases.

When the Assisting gsmSSF-FSM makes a non-error case state transition to the state **Idle** and there is one or more pending operation and TCAPTC dialogue is established, TCAPTC dialogue can be terminated by TC-END primitive with component(s).

In the case that there is no pending operation and TCAPTC dialogue is established, TCAPTC dialogue can be terminated by TC-END primitive with zero component or prearranged end. When the Assisting gsmSSF-FSM makes a non-error case state transition to the state **Idle** and there is no operation to be sent, the dialogue is ended by means of a TC-END request primitive (basic) with zero components, or the dialogue is locally ended by means of a TC-END request primitive with prearranged end.

SSME-FSM related messages

The following procedures shall be followed:

- The dialogue shall be maintained when the ActivityTest Return Result is sent.

12.1.2.1.2 gsmSCF-to-gsmSSF messages

This subclause defines the normal procedures for TC messages from the gsmSCF to the gsmSSF.

SCSM-FSM related messages

A dialogue shall be established when the SCSM-FSM receives of InitialDP operation for TDP-R or AssistRequestInstructions operation.

For subsequent operations sent from the SCSM-FSM, the dialogue shall be maintained except for the following cases, i.e. all other operations are sent after a dialogue was established from the gsmSSF (the gsmSCF has previously received a TC-BEGIN indication primitive with an InitialDP operation or an AssistRequestInstructions operation).

The dialogue shall no longer be maintained when the prearranged end condition is met in the gsmSCF. When the gsmSCF does not expect any messages other than possibly REJECT or ERROR messages for the operations sent and when the last associated operation timer expires, the dialogue is locally ended by means of a TC-END request primitive with prearranged end.

Alternatively, the sending of operations, leading to the termination of the relationship, by means of a TC-END request primitive (basic end) is possible.

SCME-FSM related messages

The operations sent from the SCME-FSM shall be issued according to the following procedures:

- The dialogue shall be maintained when the ActivityTest operation is sent.
- For sending one or more CallGap operations, the SCME FSM shall use an existing SCSM FSM associated dialogue which was initiated by a gsmSSF-FSM (i.e. established for the transmission of the InitialDP operation). The dialogue shall be maintained.

12.1.2.1.3 gsmSSF/gprsSSF-to-gsmSCF SMS related messages

A dialogue shall be established when the gsmSSF/gprsSSF has finalised trigger processing and moves to the state **Waiting for Instructions**. The relevant CAP operation, which can only be the InitialDPSMS operation, shall be transmitted in the same message.

For all other operations sent from the gsmSSF/gprsSSF, the dialogue shall be maintained.

The dialogue shall no longer be maintained when the prearranged end condition is met in the gsmSSF/gprsSSF. When the gsmSSF/gprsSSF makes a state transition to the state **Idle**, the dialogue is locally ended by means of a TC-END request primitive with prearranged end.

When the gsmSSF/gprsSSF has sent the last EventReportSMS operation the dialogue may be ended from the gsmSCF by a TC-END request primitive with basic end. The gsmSSF/gprsSSF has option to send last CAP operation in TC-END or to send a separate TC-END with zero components.

12.1.3 gsmSCF-to-gsmSSF/gprsSSF SMS related messages

All operations are sent after a dialogue was established from the gsmSSF/gprsSSF (the gsmSCF has previously received a TC-BEGIN indication primitive with an InitialSMSEvent operation).

The dialogue shall no longer be maintained when the prearranged end condition is met in the gsmSCF. When the gsmSCF does not expect any messages other than possibly REJECT or ERROR messages for the operations sent and when the last associated operation timer expires, the dialogue is locally ended by means of a TC-END request primitive with prearranged end.

Alternatively, the sending of operations, leading to the termination of the control relationship, by means of a TC-END request primitive (basic end) is possible.

12.1.3.1 Use of dialogue handling services

Dialogue handling services are used to trigger the sending of the APDUs associated with the operations involved in the CAP packages.

Component grouping is performed under the control of the application-process through an appropriate usage of the TC-BEGIN and TC-CONTINUE service.

The TC-END service is solely used to support the dialogue closing procedure (i.e it is never used to trigger the sending of components).

On receipt of an empty TC-CONTINUE.req primitive, the FE should ignore the primitive.

On receipt of an TC-END.req with a CAP request, the FE should not perform the request and consider the requested TC-END service as a dialogue closing procedure. The dialogue is then terminated (see subclause 12.1.1.1).

It is an application-process responsibility to provide in the TC-BEGIN.req primitive a destination address which can be used by the underlying SCCP to route the message to the proper FE if this FE is addressed through the SS7 network.

The pre-arranged end can be used.

12.1.3.2 Abnormal procedures

The following procedures also apply to the gsmSCF-gsmSRF interfaces.

12.1.3.2.1 gsmSCF-to-gsmSSF/gsmSRF messages

Considering that gsmSSF and gsmSRF do not have the logic to recover from error cases detected on the gsmSCF-gsmSSF/gsmSRF interface, the following shall apply:

- Operation errors and rejection of ~~TCAP~~TC components shall be transmitted to the gsmSSF and, respectively, the gsmSRF with a TC-END request primitive, basic end.

If, in violation of the above procedure, an ERROR or REJECT component is received with a TC-CONTINUE indication primitive, the gsmSSF and, respectively, the gsmSRF shall abort the dialogue with a TC-U-ABORT request primitive.

12.1.3.2.2 gsmSSF/gsmSRF/ -to-gsmSCF messages

Operation errors and rejection of ~~TCAP~~TC components shall be transmitted to the gsmSCF according to the following rules:

- The dialogue shall be maintained when the preceding message, which contained the erroneous component, indicated that the dialogue shall be maintained. I.e. the error or reject shall be transmitted with a TC-CONTINUE request primitive if the erroneous component was received with a TC-CONTINUE indication primitive.
On receipt of an ERROR or REJECT component the gsmSCF decides on further processing. It may either continue, explicitly end or abort the dialogue.
- In all other situations the dialogue shall no longer be maintained. I.e. the error or reject shall be transmitted with a TC-END request primitive, basic end, if the erroneous component was received with a TC-BEGIN indication primitive.
- on expiration of application timer TSSF or TSRF, dialogue shall be terminated by means of by TC-U-ABORT primitive with an Abort reason, regardless of ~~TCAP~~TC dialogue is established or not.

If the error processing in the gsmSSF/gsmSRF leads to the case where the gsmSSF/gsmSRF is not able to process further gsmSCF operations while the dialogue is to be maintained, the gsmSSF/gsmSRF aborts the dialogue with a TC-END request primitive with basic end or a TC-U-ABORT request primitive, depending on whether any pending ERROR or REJECT component is to be sent or not.

The gsmSSF can end a dialogue with a TC-U-ABORT request primitive in case call release is initiated by any other entity then the gsmSCF and the gsmSSF has no pending call information requests (or pending requests which should be treated in the same way, i.e., ApplyCharging nor any armed EDP to notify the gsmSCF of the call release (for alternative way, see subclause 12.1.2.1.1).

12.1.4 gsmSCF-to-gsmSSF/gprsSSF SMS related messages

Considering that the gsmSSF/gprsSSF does not have the logic to recover from error cases detected on the gsmSCF-gsmSSF/gprsSSF interface, the following shall apply:

- operation errors and rejection of ~~TCAP~~TC components shall be transmitted to the gsmSSF/gprsSSF with a TC-END request primitive, basic end.

If, in violation of the above procedure, an ERROR or REJECT component is received with a TC-CONTINUE indication primitive, the gsmSSF/gprsSSF shall abort the dialogue with a TC-U-ABORT request primitive.

12.1.5 gsmSSF/gprsSSF-to-gsmSCF SMS related messages

Operation errors and rejection of ~~TCAP~~TC components shall be transmitted to the gsmSCF according to the following rules:

- the dialogue shall be maintained when the preceding message, which contained the erroneous component, indicated that the dialogue shall be maintained. I.e. the error or reject shall be transmitted with a TC-CONTINUE request primitive if the erroneous component was received with a TC-CONTINUE indication primitive;
- on receipt of an ERROR or REJECT component the gsmSCF decides on further processing. It may either continue, explicitly end or abort the dialogue;

If the error processing in the gsmSSF/gprsSSF leads to the case where the gsmSSF/gprsSSF is not able to process further gsmSCF operations while the dialogue is to be maintained, the gsmSSF/gprsSSF aborts the dialogue with a TC-U-ABORT request primitive.

The gsmSSF/gprsSSF aborts a dialogue with a TC-U-ABORT request primitive if release is initiated by any other entity than the gsmSCF and the gsmSSF/gprsSSF has no armed EDPs to notify the gsmSCF.

12.1.5.1 Use of dialogue handling services

On receipt of a TC-U-REJECT.ind in the FE, this primitive should be ignored. It is up to the application process to abort, continue or terminate the dialogue, if not already terminated by the sending application process according to the rules as stated in subclause 12.1.1.2. This is also applicable for invoke problems related to a class 4 linked operation.

A TC-U-REJECT.req should be sent followed by a TC-CONTINUE.req.

On receipt of a TC-R-REJECT.ind in the FE, this primitive should be ignored. It is up to the application process to abort, continue or terminate the dialogue, if not already terminated by the sending application process according to the rules as stated in subclause 12.1.1.2. This is also applicable for invoke problems related to a class 4 linked operation.

On receipt of a TC-L-REJECT indication primitive (i.e. when a protocol error has been detected by the local TC entity) which cannot be related to an active operation, it is up to the application process to continue or to terminate the dialogue and implicitly trigger the transmission of the reject component or to abort the dialogue.

On receipt of a TC-NOTICE indication the TC-USER is informed that a message cannot be delivered by the Network Layer. It occurs if the Return Option has been set (see subclause 12.1.1.3.7). It is for the application process to decide whether to terminate the dialogue or retry.

The application-process is the sole user of the TC-P-ABORT service and TC-NOTICE service.

The receipt of a TC-U-ABORT-Ind or TC-P-ABORT-Ind on a dialogue terminates all request processing.

12.1.5.2 Dialogue handling

12.1.5.2.1 Dialogue establishment

12.1.5.2.2 Dialogue continuation

12.1.5.2.3 Dialogue termination

12.1.5.2.4 User abort

12.1.5.2.5 Provider abort

12.1.5.2.6 Mapping to TC dialogue primitives

The gsmSSF-gsmSCF IN services can be mapped onto TC services. This subclause defines the mapping of the gsmSSF-gsmSCF IN services onto the services of the TC dialogue handling services defined in ETS 300 287-1 [6].

- a) The TC-BEGIN service is used to invoke the operations of the gsmSCF-gsmSSF connection packages as defined in clause 6.
- b) The TC-CONTINUE service is used to report the success of the operations invoked in a TC-BEGIN service and to invoke or respond to any other operations.
- c) The TC-U-ABORT service is used to report the failure of operations of the connection packages as defined in clause 6.

The mapping of the parameters onto the TC-BEGIN primitive is defined in subclause 12.1.1.3.6 with the following qualifications:

- The AC Name parameter shall take the value of the application-context-name field of the cap3-sms-AC object if the initiating AE is a gsmSSF.

The mapping of the parameters onto the TC-CONTINUE primitive is defined in subclause 12.1.1.3.6.

The mapping of the parameters onto the TC-U-ABORT primitive is defined in subclause 12.1.1.3.6 with the following qualifications:

- The Application-Context-Name parameter shall be used as specified in ETS 300 287-1 [6]. When the responding AE refuses a dialogue because the application-context-name it receives is not supported, this parameter shall have the value of the application-context-name field of the cap3-sms-AC object if the responding AE is a gsmSCF.

The use of the parameters of the TC-END service is defined in subclause 12.1.1.3.6.

12.1.5.3 Component Handling

12.1.5.3.1 Procedures for CAP operations

The CAP ASEs are users of the TC component handling services except for the TC-L-REJECT and TC-L-CANCEL services which are used by the application-process. Receipt of a TC-L-REJECT-Ind leads the application-process to abandon the dialogue (i.e. it issues a TC-U-ABORT-Request primitive).

The TC-U-CANCEL service is never used.

12.1.5.3.2 Mapping to TC component parameters

The gsmSSF-gsmSCF IN ASE services are mapped onto the TC component handling services. The mapping of operations and errors onto TC services is defined in subclause 12.1.1.4.2 with the following qualifications:

The timeout parameter of the TC-INVOKE-Req primitives is set according to clause 6.

12.1.6 gsmSCF-gsmSRF interface

12.1.6.1 Normal procedures

12.1.6.1.1 SCF-to/from-gsmSRF messages

A dialogue is established when the gsmSRF sends an AssistRequestInstructions operation to the gsmSCF. For all other operations sent to/from the gsmSRF, the dialogue shall be maintained.

In the case that there is no pending operation and TCAPTC dialogue is established, TCAPTC dialogue can be terminated by TC-END primitive with zero component. When the SCSM makes a non-error case state transition to end user interaction and there is no operation to be sent, the dialogue is ended by means of a TC-END request primitive (basic) with zero components.

The dialogue shall no longer be maintained when sending the SpecialisedResourceReport operation for PlayAnnouncement with disconnection from the gsmSRF set to true or Return Result of the PromptAndCollectUserInformation with disconnection from the gsmSRF set to true with disconnection from the gsmSRF set to true. The dialogues is ended by means of a TC-END request primitive with basic end, and the one of above operations is transmitted with the same request.

Regardless of whether pending operation exists or not, when the SRSM-FSM is informed of the disconnection of bearer connection (in the case of gsmSCF initiated disconnection or call abandon from call party) and dialogue is established, the dialogue is ended by means of a TC-END request primitive (basic) with zero components or TC-END request primitive (prearranged end).

The dialogue shall no longer be maintained when the prearranged end condition is met in the gsmSRF. When the SRSM-FSM is informed the disconnection of bearer connection and TCAPTC dialogue is not established, TCAPTC dialogue is locally terminated by TC-END primitive with prearranged end.

When the gsmSCF does not expect any messages other than possibly REJECT or ERROR messages for the operations sent and when the last associated operation timer expires, the dialogue is locally ended by means of a TC-END request primitive with prearranged end. Alternatively, the sending of operations, leading to the termination of the relationship, by means of a TC-END request primitive (basic end) is possible.

In the relay case, the gsmSRF-gsmSCF relationship uses the gsmSSF-gsmSCF TCAPTC dialogue. This is possible, because begin and end of the gsmSRF-gsmSCF relationship are embedded in the gsmSSF-gsmSCF relationship. gsmSRF-gsmSCF information shall be exchanged with TC-CONTINUE request primitives.

12.1.6.1.2 Abnormal procedures

12.1.6.1.3 Dialogue handling

12.1.6.1.4 Dialogue establishment

12.1.6.1.5 Dialogue continuation

12.1.6.1.6 Dialogue termination

12.1.6.1.7 User abort

12.1.6.1.8 Provider abort

12.1.6.1.9 Mapping to TC dialogue primitives

The gsmSCF-gsmSRF IN services can be mapped onto TC services. This subclause defines the mapping of the gsmSCF-gsmSRF IN services onto the services of the TC dialogue handling services defined in ETS 300 287-1 [6].

- a) The TC-BEGIN service is used to invoke the operations of the **gsmSRF-gsmSCF** connection packages as defined in clause 6.

- b) The TC-CONTINUE service is used to report the success of the operations invoked in a TC-BEGIN service and to invoke or respond to any other operations.
- c) The TC-U-ABORT service is used to report the failure of operation of the **gsmSCF-gsmSRF** operations packages as defined in clause 6.

The mapping of parameters onto the TC Dialogue services is as defined in subclause 12.1.1.3.6 with the following qualifications:

The mapping of the parameters onto the TC-BEGIN primitive is defined in subclause 12.1.1.3.6 with the following qualifications:

- The AC Name parameter shall take the value of the application-context-name field of the **gsmSRF-gsmSCF-ac** object.

12.1.6.2 Component handling

12.1.6.2.1 Procedures for CAP operations

12.1.6.2.2 Mapping to TC component parameters

The mapping of parameters for the TC component services is defined in subclause 12.1.1.4.2 with the following qualifications.

The Timeout Parameter of the TC-INVOKE service is set according to clauses 6.

12.1.7 gprsSSF-gsmSCF interface

12.1.7.1 Normal procedures

12.1.7.1.1 TC-dialogues and relationships

The GPRS dialogue can consist of multiple consecutive **TCAPTC-dialogues**. A GPRS dialogue is identified by a GPRS-ReferenceNumber consisting of the originationReference and the destinationReference. One GPRS-Reference is assigned by the SGSN and shall be unique within this SGSN. The other GPRS-Reference is assigned by the gsmSCF and shall be unique within this gsmSCF.

The **TCAPTC**-dialogues are closed and (re)opened whenever necessary.

12.1.7.1.2 Use of the GPRS Reference

For the use of CAP defined GPRS-ReferenceNumber, see also the ASN.1 notation in the subclause 8.1.

When the gprsSSF sends the first operation for a new GPRS dialogue (InitialDPGPRS), the gprsSSF shall include a GPRS Reference Number in the **TCAPTC** message. This GPRS Reference Number shall consist of the **SGSN Process Id** as originationReference, which is internally allocated by the gprsSSF. This number is used by the gprsSSF to associate an incoming **TCAPTC** message with an internal GPRS Process.

When the gsmSCF has received the InitialDPGPRS operation, it shall store the SGSN Process ID and allocate an **SCF Process Id** which is used by the gsmSCF to associate an incoming **TCAPTC** message with an internal SCF Process.

The SCP shall include the GPRS Reference Number in the first TC-CONTINUE message, **SGSN Process Id** in destinationReference and **SCF Process Id** in originationReference, returned to the gprsSSF.

When the gprsSSF receives the first **TCAPTC** message from the SCP for this GPRS dialogue, the gprsSSF shall store the SCP Process Id together with the SGSN Process Id.

From here onwards all the **TCAPTC** messages that open a new **TCAPTC** dialogue shall include the GPRS Reference Number consisting of the originationReference and the destinationReference to associate the internal process in the origination entity and the destination entity, respectively, until the end of the relationship between these processes.

For any TC-CONTINUE in the existing **TCAPTC** dialogue, transporting the GPRS Reference Number is not needed except for the first response after the InitialDPGPRS operation.

12.1.7.1.3 gprsSSF-to-gsmSCF messages

This subclause defines the normal procedures for TC messages from the gprsSSF to the gsmSCF.

gprsSSF-FSM related messages

A GPRS dialogue and a TCAPTC dialogue shall be established when the gprsSSF moves from the state **Idle** to the state **Waiting for Instructions**. The InitialDPGPRS operation shall be transmitted in the same TCAPTC message, i.e. TC-BEGIN. It shall contain the GPRS-Reference as assigned by the SGSN in the originationReference. The gprsSSF may initiate the subsequent TCAPTC dialogues for this GPRS dialogue with the following operations:

- ApplyChargingReportGPRS
- EntityReleasedGPRS
- EventReportGPRS

The gprsSSF shall memorise the gsmSCF address used for InitialDPGPRS, and use it in the further TCAPTC dialogues. The gsmSCF shall memorise the gprsSSF address received along with the InitialDPGPRS, and use it in the further TCAPTC dialogues for the relationship between these processes.

The gsmSCF may open subsequent TCAPTC dialogues with the following CAP operations:

- ActivityTestGPRS;
- ApplyChargingGPRS;
- CancelGPRS;
- FurnishChargingInformationGPRS;
- ReleaseGPRS;
- RequestReportGPRSEvent;
- SendChargingInformationGPRS.

The CAP operation that opens a TCAPTC dialogue shall be sent with a TC-BEGIN request primitive. This message shall contain the GPRS-ReferenceNumber assigned by the sender of this message in the originationReference. If the operation opens a subsequent TCAPTC dialogue this message shall contain also the previously received destinationReference. If an operation opens a GPRS dialogue then the TCAPTC message reply shall contain the originationReference as assigned by the sender, i.e. the gsmSCF.

The TCAPTC dialogue shall be closed for the idle periods, i.e. when the gprsSSF moves from the **Waiting for Instructions** state to the **Idle** state, if the gprsSSF is in the Monitoring state and has received all replies or time-outs for the operations sent, after standalone operations of the SCF in Monitoring state if gprsSSF is not going to the Idle state (ActivityTestGPRS, ApplyChargingGPRS, CancelGPRS, FurnishChargingInformationGPRS, RequestReportGPRSEvent, SendChargingInformationGPRS), or at the end of a GPRS dialogue.

Each TCAPTC dialogue shall be terminated by the gprsSSF using TC-END (basic end). The following operations can cause the end of the *GPRS dialogue*:

- ContinueGPRS;
- ConnectGPRS;
- ApplyChargingReportGPRS result;
- EntityReleasedGPRS result;
- EventReportGPRS (EDP-N) result;
- CancelGPRS;
- ReleaseGPRS;
- RequestReportGPRSEvent (disarming of DPs).

When the gprsSSF makes a non-error case state transition to the state **Idle** and there is one or more pending operation and **TCAPTC** dialogue is established, **TCAPTC** dialogue may be terminated by TC-END primitive with zero component(s) after all pending operations have been sent. When the gsmSCF sends the last EventReportGPRS or ApplyChargingReportGPRS the GPRS dialogue may be ended from the gprsSSF by a TC-END request primitive with basic end.

In the case that there is no pending operation, result nor error, and **TCAPTC** dialogue is established, **TCAPTC** dialogue shall be terminated by TC-END primitive with zero component.

In the case where a PDP context release or detach is initiated by any other entity than an gsmSCF, the gprsSSF shall end a GPRS dialogue with the EntityReleasedGPRS operation if the gprsSSF has no armed DP to report nor pending ApplyChargingReportGPRS which should reported.

In the case of overlapping dialogues for the same GPRS dialogue the gsmSCF opened **TCAPTC** dialogue is aborted by the gprsSSF with the abort reason overlapping-dialogue as specified in clause 5.7. This abort reason is used to indicate to the gsmSCF that a specific instance already has a **TCAPTC** dialogue open. It is typically obtained when both the gsmSCF and gprsSSF open a new dialogue at the same time. While the gprsSSF waits for a response to an operation sent in TC-BEGIN it may receive an operation from the gsmSCF in TC-BEGIN. In such cases the dialogue opened by the gprsSSF is maintained and the dialogue opened by the gsmSCF is aborted with this abort reason.

SSME-FSM related messages

The following procedures shall be followed:

- The dialogue shall be ended with basic end when the ActivityTestGPRS Return Result is sent.

12.1.7.1.4 gsmSCF-to-gprsSSF messages

This subclause defines the normal procedures for TC messages from the gsmSCF to the gprsSSF.

In the case of overlapping dialogues for the same relationship the gsmSCF opened dialogue is closed by the gprsSSF with an error code as specified in clause 10. The gsmSCF shall first respond normally to the operations sent by the gprsSSF, and then decide on the further actions.

SCME-FSM related messages

The operations sent from the SCME-FSM shall be issued according to the following procedures:

- A new subsequent **TCAPTC** dialogue is established when the ActivityTestGPRS operation is sent.

12.1.7.2 Abnormal procedures

12.1.7.2.1 gsmSCF-to-gprsSSF messages

This subclause defines the abnormal procedures for TC messages from the gsmSCF to the gprsSSF.

Considering that gprsSSF do not have the logic to recover from error cases detected on the gsmSCF-gprsSSF interface, the following shall apply:

- Operation errors and rejection of **TCAPTC** components shall be transmitted to the gprsSSF with a TC-END request primitive, basic end.
- The GPRS dialogue shall be closed.

If, in violation of the above procedure, an ERROR or REJECT component is received with a TC-CONTINUE indication primitive, the gprsSSF shall abort the dialogue with a TC-U-ABORT request primitive.

12.1.7.2.2 gprsSSF-to-gsmSCF messages

This subclause defines the abnormal procedures for TC messages from the gprsSSF to the gsmSCF.

Operation errors and rejection of **TCAPTC** components shall be transmitted to the gsmSCF according to the following rules:

- The TC dialogue shall be maintained when the preceding message, which contained the erroneous component, indicated that the dialogue shall be maintained. I.e. the error or reject shall be transmitted with a TC-CONTINUE request primitive if the erroneous component was received with a TC-CONTINUE indication primitive.
On receipt of an ERROR or REJECT component the gsmSCF decides on further processing. It may either continue, explicitly end or abort the TC dialogue. If the TC dialogue is closed due to such error, also GPRS dialogue shall be closed.
- In all other situations the dialogue shall no longer be maintained. I.e. the error or reject shall be transmitted with a TC-END request primitive, basic end, if the erroneous component was received with a TC-BEGIN indication primitive. The GPRS dialogue shall be closed.
- on expiration of application timer T_{SSF} , the TC dialogue shall be terminated by means of by TC-U-ABORT primitive with an Abort reason. The GPRS dialogue shall be closed.

If the error processing in the gprsSSF leads to the case where the gprsSSF is not able to process further gsmSCF operations while the TC dialogue is to be maintained, the gprsSSF aborts the TC dialogue with a TC-END request primitive with basic end or a TC-U-ABORT request primitive, depending on whether any pending ERROR or REJECT component is to be sent or not.

The gprsSSF can end a TC dialogue with a TC-U-ABORT request primitive in the following case:

- Any entity other than the gsmSCF initiates closure of the GPRS dialogue, and
- The gprsSSF has no pending reports, and
- The gprsSSF has no armed EDP to notify the gsmSCF that the GPRS dialogue has been closed.

For an alternative method, see subclause 12.1.7.1.1.

12.1.7.2.3 Default GPRS Handling

If a TC dialogue is closed due to unrecoverable TC/protocol error (does not apply to the overlapping TC dialogues), or aborted by the gsmSCF, or at the Tssf expiry, then the gprsSSF shall check the applicable Default GPRS Handling parameter of the GPRS-CSI. In this context the applicable Default GPRS Handling is the one that corresponds the TDP that opened the GPRS dialogue. The same default handling shall apply to all state models that are controlled by the particular GPRS dialogue.

12.2 Services assumed from SCCP

This subclause describes the services required from the SCCP that may be used by the CAMEL applications for the CAMEL Application Part (CAP) used between the gsmSSF, assisting gsmSSF, gsmSRF, gprsSSF, and gsmSCF

The following SCCP revisions are supported by CAP version 3:

- Signalling Connection Control Part, Signalling System no. 7 CCITT ('Blue Book SCCP')
- Signalling Connection Control Part, Signalling System no. 7 ITU-T Recommendation Q.711 to Q.716 ('White Book SCCP')

NOTE: Support of White Book SCCP at the receiving side shall be mandated from 00:01hrs, 1st July 2002(UTC).

- ANSI T1.112-1996 [40] : "American National Standards for Telecommunications– Signalling System Number 7 (SS7) – Signalling Connection Control Part (SCCP)".

When CAP uses White Book SCCP to send a message, and SCCP segments the message into one or more XUDT messages, then the transmission of this message may fail.

Failure will occur when the destination SCCP, or any intermediate SCCP, does not support White Book SCCP.

Support of ANSI T1.112 SCCP applies only to PLMNs in North America. Interworking between a PLMN in North America and a PLMN outside North America will involve a STP to translate between ANSI SCCP and ITU-T/CCITT SCCP.

12.2.1 Normal procedures

The SCCP forms the link between the TC and the MTP and provides (in conjunction with the MTP) the network services for the CAMEL applications. The network services provided allow the signalling messages sent by the application to the lower layers to be successfully delivered to the peer application.

12.2.2 Service functions from SCCP

12.2.2.1 SCCP connectionless services

The services described are those given in the SCCP ITU-T recommendations Q.711 to Q.716 should be consulted to identify possible interworking and compatibility issues between the different SCCP versions.

The following Connection-less services are expected from the SCCP:

- a) Network Addressing to enable signalling connections between SCCP users;
- b) Sequence Control to enable the SCCP users to invoke "sequence guaranteed" or "sequence not guaranteed" options for a given stream of messages to the same destination;
- c) Segmentation/reassembly of large user messages (only for 'White Book SCCP');
- d) Return Option to enable the SCCP users to invoke "discard message on error" or "return message on error" for a given message not able to be delivered by the SCCP to the destination SCCP user, due to routing or segmentation/re-assembly failure;
- e) Congestion control.

The primitives used for the above services are given below.

The N-UNITDATA request and N-UNITDATA indication primitives are used to send and receive data. The parameters of these primitives include the Called and Calling Addresses, Sequence Control, Return Option and User Data with the addressing parameters always mandatory.

The N-NOTICE indication primitive is used to return undelivered data if return option is set and a routing/segmentation error occurs.

12.2.2.1.1 Sub-System Number (SSN)

The use of SSN is a network operator option and values for intra-PLMN usage are network specific. A CAP SSN has been reserved for inter-PLMN use, as defined in 3G TS 23.003 [49].

12.2.2.1.2 Addressing

The addressing elements consist of information contained within the Calling and the Called Party Addresses which are sent by the application to the lower layers.

The application expects the SCCP to route messages by either (a) the use of the Destination Point Code (DPC) plus the Subsystem Number (SSN), or (b) the use of the GT plus optionally the SSN. The application also specifies to the lower layer whether to route the message on the DPC or the GT.

Method (a) above may be used when the application is aware of the destination point code and the destination SSN located at that point code to which the message is to be delivered. Within a national network different SSNs, according to ITU-T SCCP recommendation Q.713 [41], may be allocated for the different network specific applications, e.g. a SSN may be allocated for a gsmSCF functionality.

Method (b) above may be used when a message is to be delivered to a SCCP-user which can be identified by the combination of the elements within the GT. An example of the use of this method is when messages have to be delivered between different networks. This method may be used since the originating network is unaware of the point code and SSN's allocations within the destination network. The network that determines the end-node to which the message is to be delivered has to perform a GT Translation to derive the destination Point Code and the SSN. If optionally the original address contained the SSN, then this may be used as the destination SSN, or the translation may, if required, provide an appropriate new SSN.

When GT is used for addressing, the CAMEL application expects that the SCCP supports the following elements as defined in ITU-T SCCP recommendation Q.713 [41]:

Address Indicator:

The application will set this indicator to indicate one or any combination of the elements "signalling point code, GT, subsystem number" in the address information octets.

GT Indicator:

This indicator specifies the method employed for the formatting of the address information. There are four values (1 to 4), for example, the value 4 indicates that the format includes the numbering plan, the nature of the address indicator and the translation type. The format with the indicator value 4 is always used for internetwork connections.

Translation Type:

The Translation Types are defined within ITU-T SCCP recommendation Q.713 [41].

Numbering Plan:

- 1) The *proposed* "generic numbering plan" is described within the ITU-T SCCP recommendation Q.713 [41]. This numbering plan identifies the SCCP nodes or SCCP subsystems unambiguously such that messages may be efficiently routed within one or more networks, and is particularly useful when used in the Calling Address for the sending of a response message back to the originating node. This is achieved by having an international and a national part in the generic numbering plan. For response messages the responding node analyses the international part of the generic numbering plan to determine the gateway node to which the response is to be routed. Having routed to the gateway node, the national part (which was populated within the originating network) is analysed to determine the originating node within the originating network.
- 2) A numbering plan which would define particular nodes based specifically on services is *outside the scope of CAMEL*.
- 3) The SCCP caters for a number of other numbering plans (e.g. ISDN, Mobile etc. numbering plans). The whole range catered for is shown in [2]. These may be used by CAMEL applications if deemed suitable.

Encoding Scheme:

This identifies the encoding scheme employed by the application and is generally BCD encoded with odd or even number of digits.

GT Address Information:

These are the actual address digits supplied by the application and may be BCD digits or encoded as indicated by the encoding scheme.

The network provider must ensure that any change of GT value during translation preserves any CAP specific information contained in the initial GT value.

This requirement applies to all interfaces, not just those used for internetworking.

If *route on SSN* is to be supported from the originating node then a ITU-T non-zero internationally standardized SSN is required for international internetworking.

In the absence of a ITU-T standardized non-zero SSN for CAP services, the use of *route on GT* is mandatory from the origin node to the network containing the destination node.

When the SCCP of CCITT Signalling System No. 7 is used, the format and coding of address parameters carried by the SCCP for that purpose shall comply with ITU-T Recommendation Q.713 [41] with the following restrictions:

1) Intra-PLMN addressing

For communication between entities within the same PLMN, the use of SCCP addressing is network specific, and method (a) and (b) are both applicable.

2) Inter-PLMN addressing

method (b) with the mandatory SSN is only applicable with the following format:

i) Called Party Address

- SSN indicator = a standardised SSN shall be used. The SSN used shall be that specified for CAP in 3G TS 23.003[49];
- Point Code indicator = 0;
- Global title indicator = 0100 (Global title includes translation type, numbering plan, encoding scheme and nature of address indicator);
- Translation type = 0 (Not used);
- Routing indicator = 0 (Routing on global title);

The format is also described in the table 12-2 below (for NP=1, NAI=4):

Note to MCC: I have corrected the table style.

Table 12-2: Called Party Address format

8	7	6	5	4	3	2	1		
0	RI = 0	GTI = 4 (0100)				SSNI = 1	PCI = 0		Octet 1
SSN = a value for CAP as specified in 3G TS 23.003 [49]								Octet 2	
Translation type = 0								Octet 3	
Numbering plan = 1 (E.164)				Encoding scheme = 1 or 2				Octet 4	
0	Nature of address indicator = 4 (International)							Octet 5	
Country code digit 2 (if present)				Country code digit 1				Octet 6	
National Destination Code (NDC) Digit 1				Country code digit 3 (if present)				Octet 7	
NDC digit 3 (if present)				NDC digit 2 (if present)				Octet 8	
NDC digit 5 (if present)				NDC digit 4 (if present)				Octet 9	
Equipment identification digit 2				Equipment identification digit 1				Octet 10	
...				
filler = 0 (if needed)				Equipment identification digit m				Octet n	

Note - Country code, National Destination Code, and SN(equipment id) are provided as example, so each digit may differ for each Inter-PLMN addressing case. (e.g., there is a case where only CC digit 1 shall be used). See ITU-T recommendation Q.713 [41] for translation rules.

ii) Calling Party Address

- SSN indicator = a standardised SSN shall be used. The SSN used shall be that specified for CAP in 3G TS 23.003[49];
- Point code indicator = 0;
- Global title indicator = 0100 (Global title includes translation type, numbering plan, encoding scheme and nature of address indicator);
- Translation type = 0 (Not used);
- Routing indicator = 0 (Routing on Global Title).

The format is also described in the table 12-3 below (for NP=1, NAI=4):

Table 12-3: Calling Party Address format

8	7	6	5	4	3	2	1	
0	RI = 0	GTI = 4				SSNI = 1	PCI = 0	Octet 1
SSN = a value for CAP as specified in 3G TS 23.003 [49]								Octet 2
Translation type = 0								Octet 3
Numbering plan = 1 (E.164)				Encoding scheme = 1 or 2				Octet 4
0	Nature of address indicator = 4 (International)							Octet 5
Country code digit 2 (if present)				Country code digit 1				Octet 6
National Destination Code (NDC) Digit 1				Country code digit 3 (if present)				Octet 7
NDC digit 3 (if present)				NDC digit 2 (if present)				Octet 8
NDC digit 5 (if present)				NDC digit 4 (if present)				Octet 9
Equipment identification digit 2				Equipment identification digit 1				Octet 10
...			
filler = 0 (if needed)				Equipment identification digit m				Octet n

Note - Country code, National Destination Code, and SN(equipment id) are provided as example, so each digit may differ for each Inter-PLMN addressing case. (e.g., there is a case where only CC digit 1 shall be used). See ITU-T recommendation Q.713 [41] for translation rules.

When the SCCP of ANSI Signalling System No. 7 is used, the format and coding of address parameters carried by the SCCP for the purpose of signalling transfer shall comply with ANSI Recommendation T1.112 [40] with the following restrictions:

1) Intra-PLMN addressing

For communication between entities within the same PLMN, the use of SCCP addressing is network specific.

2) Inter-PLMN addressing

a) Called Party Address

- SSN indicator = a standardised SSN shall be used. The SSN used shall be that specified for CAP in 3G TS 23.003[49];
- Point Code indicator = 0;
- Global title indicator = 0010 (Global title includes translation type);
- the Translation Type (TT) field shall be coded according to the content of the address information as follows:
 - TT = 9 (decimal), if IMSI is included
 - TT = 14 (decimal), if MSISDN is included,
 - or TT = 10 (decimal), if a Network Element address is included. (If TT=10, then Number Portability is not applicable, if TT=14, then Number Portability is applicable)
- Routing indicator = 0 (Routing on global title);

b) Calling Party Address

- SSN indicator = a standardised SSN shall be used. The SSN used shall be that specified for CAP in 3G TS 23.003[49];
- Point code indicator = 0;
- Global title indicator = 0010 (Global title includes translation type);
- the Translation Type (TT) field shall be coded according to the content of the address information as follows:
 - TT = 9 (decimal), if IMSI is included
 - TT = 14 (decimal), if MSISDN is included,
 - or TT = 10 (decimal), if a Network Element address is included. (If TT=10, then Number Portability is not applicable, if TT=14, then Number Portability is applicable)

- Routing indicator = 0 (Routing on Global Title).

12.2.2.1.3 Sequence control

The application will specify whether SCCP protocol class 0 or 1 is required. Class 0 provides a basic connection-less service where the sequence of message delivery is not guaranteed. Class 1 connection-less service provides a guaranteed sequence delivery of messages (with the same called address) for a given stream of messages. Class 1 shall be requested by any application that can send more than 1 ~~TC-AP~~TC message to its peer (consecutive TR-CONTINUE) before receiving a response from its peer (TR-CONTINUE or TR-END).

On receipt of a TC-RESULT-NL indication, the TC-USER shall request the transfer of a reject component using TC-U-REJECT request primitive, with the appropriate problem code (mistyped parameter).

The return option may be used if requested by the application (Network Operator to determine).

12.2.2.1.4 Return on error

Return on Error mechanism may be required by the CAMEL applications such that the application is aware of messages that have not been delivered to the destination by the SCCP. The return option allows the return of the message that was not delivered due to routing or segmentation/re-assembly failure back to the issuing user. This return option may be required in all segments of a long message or only in the first segment by the CAMEL applications.

If the return option is invoked by the application and the message is not delivered then the SCCP specifies the "return reason" as specified in ITU-T SCCP recommendation Q.713 [41]. The N-NOTICE primitive is used to return the undelivered message to the originating user.

12.2.2.1.5 Segmentation / reassembly

The application expects that since the SCCP can send up to 260 octets of user data (including the address information and TC-message) in a UDT message (248 octets in a XUUDT message performing segmentation and congestion control), segmentation is available for long user messages.

Also the SCCP is expected to perform the reassembly function on received segmented messages and deliver the reassembled message to the user.

However, it should be noted that even though the theoretical maximum size of SCCP-user data and addresses that can be segmented by the SCCP is 3 968 octets, the SCCP-user would limit the length to about 2 560 octets to allow for the largest known addresses. Note that the application must also allow for the octets used for the TC-message in the 2 560 octets.

The CAMEL application does not expect the SCCP to segment the long message into more than 16 segments.

12.2.2.1.6 Congestion control

To help control of possible congestion that might occur in the lower layers the application may assign a value to indicate the importance of the message. The use of this parameter requires the use of SCCP (1997) ITU-T Recommendations.

Also there exist other congestion control mechanisms as indicated below in SCCP Management.

These congestion control methods are network operator option in case of intra-PLMN network signalling, and shall not be used in case of inter-PLMN network signalling.

12.2.2.2 SCCP connection oriented services

The use by CAMEL applications for the Connection-oriented services is outside the scope of CAMEL.

12.2.2.3 SCCP management

The subsystems used within the CAMEL application expect the SCCP to provide management procedures to maintain network performance by re-routeing in the event of failure of a subsystem, and in case of network congestion by use of the congestion handling procedure. These procedures have appropriate interactions with the SCCP user as described in ITU-T SCCP recommendations Q.713 [41] and Q.714 [50].

To achieve the above the SCCP is expected to perform the following procedures:

- Signalling point status management (which include the signalling point prohibited, signalling point allowed, signalling point congested, and local MTP availability sub procedures).
- Subsystem status management (which include the subsystem prohibited, subsystem allowed, and subsystem status test sub procedures).
- Co-ordinated state change (a procedure which allows a duplicated subsystem to be withdrawn from service without affecting the performance of the network).

These SCCP management procedures are network operator option in case of intra-PLMN network signalling, and shall not be used in case of inter-PLMN network signalling.

*****Change in the clause 5.1 Data Types *****

```
ElapsedTime ::= CHOICE {
    timeGPRSIfNoTariffSwitch [0] INTEGER (0..86400),
    timeGPRSIfTariffSwitch [1] SEQUENCE {
        timeGPRSSinceLastTariffSwitch [0] INTEGER (0..86400),
        timeGPRSTariffSwitchInterval [1] INTEGER (0..86400) OPTIONAL
    }
}
-- timeGPRSIfNoTariffSwitch is measured in seconds
-- timeGPRSSinceLastTariffSwitch and timeGPRSTariffSwitchInterval are measured in seconds
```

*****Change in the clause 11.6 (style change)*****

11.6 ApplyChargingReportGPRS procedure

11.6.1 General description

This operation is used by the gprsSSF to report charging related information to the gsmSCF as requested by the gsmSCF using the ApplyChargingGPRS operation. A report shall be made either when a PDP context deactivation, Detach event or Change in QoS is detected by the gprsSSF or when the gprsSSF detects that the transferred volume or elapsed time duration indicated in parameter transferredVolume or elapsedTime (received in ApplyChargingGPRS operation) has been reached.

That sending of ApplyChargingReportGPRS shall only be made on chargeable QoS changes, i.e. normally upon MS initiated QoS changes.

The gprsSSF shall immediately restart timing duration and measuring transferred data for the GPRS Session or PDP Context for which the report was sent.

11.6.1.1 Parameters

- chargingResult:
This parameter provides the SCF with the charging related information previously requested using the ApplyChargingGPRS operation. The "ChargingResult" is a choice, and can contain either of the following parameters:
 - transferredVolume:
This is a choice of the following parameters:
 - volumeIfNoTariffSwitch:
This parameter will be present if no tariff switch has occurred since the detection of the event that triggered volume count (e.g. PDP context activation acknowledgement) occurred. If present, then the volume transferred since that event will be reported.
 - volumeIfTariffSwitch:
This parameter will be present if a tariff switch has occurred since the detection of the event that triggered volume count (e.g. PDP context establishment acknowledgement) occurred. If present then the parameter may contain the following information:
 - volumeSinceLastTariffSwitch:
The volume since the last tariffSwitch is reported.
 - VolumeTariffSwitchInterval:
This parameter is present only if a tariff switch was detected in the current volume count period. If present, the volume between either the detection the event that triggered volume count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.
 - elapsedTime: CR editor's note: Style "B2"
This is a choice of the following parameters:
 - timeGPRSIfNoTariffSwitch: CR editor's note: Style "B3"
This parameter will be present if no tariff switch has occurred since the detection of the event that triggered time count (e.g. attach) occurred. If present then the elapsed time since that event will be reported.
 - timeGPRSIfTariffSwitch: CR editor's note: Style "B3"
This parameter will be present if a tariff switch has occurred since the detection of the event that triggered time count (e.g. attach) occurred. If present then the parameter may contain the following information:
 - timeGPRSSinceLastTariffSwitch: CR editor's note: Style "B4"
The time since the last tariffSwitch is reported.

- timeGPRSTariffSwitchInterval: CR editor's note: Style "B4"
This parameter is present only if a tariff switch was detected in the current time count period. If present, the time between either the detection the event that triggered time count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.
- qualityOfService:
This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN.
This parameter is only present when the sending of Apply Charging Report GPRS operation was triggered by a change in Quality of Service.
- active:
This parameter indicates whether the GPRS session or PDP context is still active
- pDPID:
This parameter, if present, identifies the PDP Context, within the Session dialogue, for which the charging report is valid.

4.1.1 Definition methodology

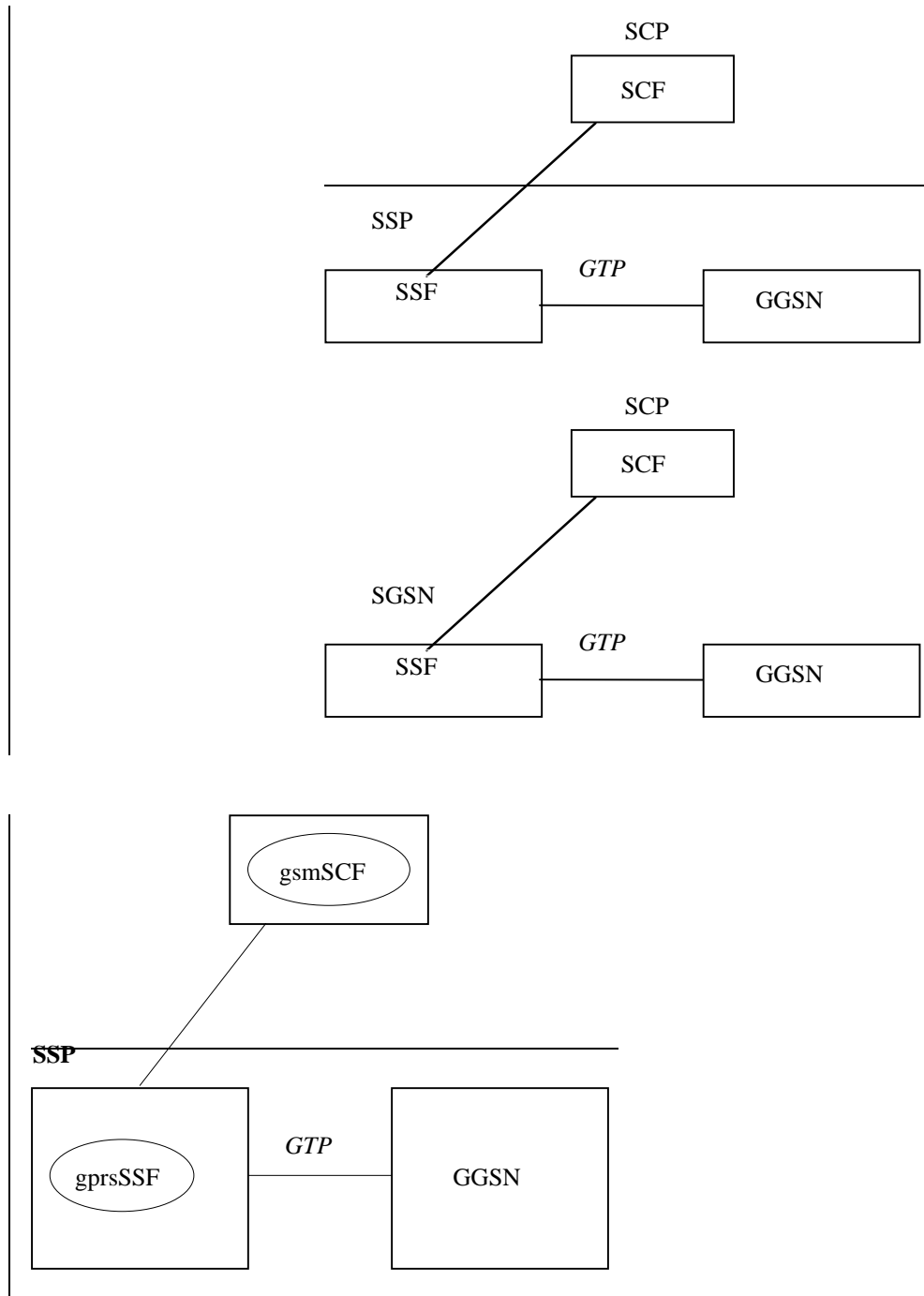
The definition of the protocol can be split into three sections:

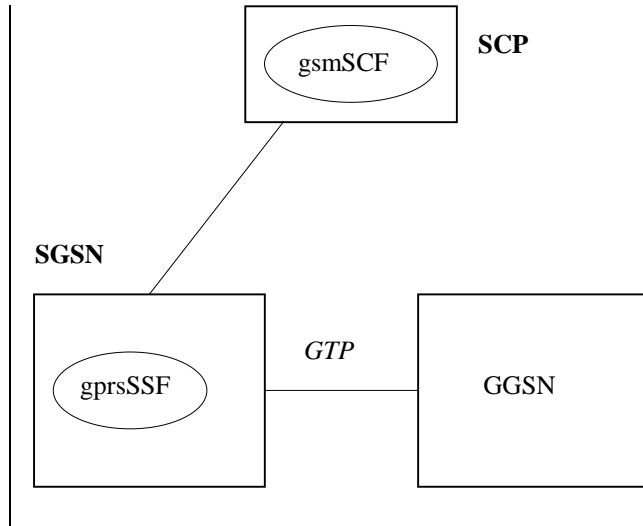
- the definition of the Single Association Control Function (SACF)/Multiple Association Control Function (MACF) rules for the protocol;
- the definition of the operations transferred between entities;
- the definition of the actions taken at each entity.

The SACF/MACF rules are defined in prose. The operation definitions are in Abstract Syntax Notation One (ASN.1), see CCITT Recommendations X.208 [29], ITU-T Recommendation X.680 [33]), and the actions are defined in terms of state transition diagrams. Further guidance on the actions to be performed on receipt of an operation can be gained from the description of the relevant information flow in ITU-T Recommendation Q.1224 [24].

**** NEXT MODIFIED SECTION ****

4.1.2 Example physical scenarios





Scenario 5. GPRS interworking. No connection to IP.

**** NEXT MODIFIED SECTION ****

4.1.4.2 Definition of CAP compatibility mechanisms

4.1.4.32.1 Compatibility mechanism for interworking of CAP with ETSI CS2 Core INAP and ITU-T Q.1228 INAP

On receipt of an operation according to ITU-T Recommendation Q.1228 [26] or an operation according to EN 301 140-1 [39], which is not part of the CAP or is part of the CAP but which contains parameters which are not part of the CAP:

- the gsmSSF, gsmSCF, assistingSSF and gsmSRF shall apply the normal error handling for unknown operations or parameters, i.e. the normal error handling procedures as specified in clause 10 shall be followed.

Tagging of CAP additions to ITU-T Recommendation Q.1228 [26] and EN 301 140-1 [39] are specified from 50 to 59.

4.1.4.42.2 Procedures for major additions to CAP

In order to support the introduction of major functional changes, the protocol allows a synchronization between the two applications with regard to which functionality is to be performed. This synchronization takes place before the new function is invoked in either application entity, in order to avoid complicated fall-back procedures. The solution chosen to achieve such a synchronization is use of the AC negotiation provided in ETS 300 287 [6].

4.1.4.52.3 Procedures for minor additions to CAP

The extension mechanism marker shall be used for future standardized minor additions to CAP. This mechanism implements extensions by including an "extensions marker" in the type definition. The extensions are expressed by optional fields that are placed after the marker. When an entity receives unrecognized parameters that occur after the marker, they are ignored (see ITU-T Recommendation X.680 [33]).

4.1.4.62.4 Procedures for inclusion of network specific additions to CAP

This mechanism is based on the ability to explicitly declare fields of any type via the Macro facility in ASN.1 at the outermost level of a type definition. It works by defining an "ExtensionField" that is placed at the end of the type definition. This extension field is defined as a set of extensions, where an extension can contain any type. Each extension is associated with an identification that unambiguously identifies the extension. Refer to ITU-T Recommendation Q.1400 [28] for a definition of this mechanism.

**** NEXT MODIFIED SECTION ****

5.1 Data types

-- The **Definition of Common Data Types** follows

.

```
| TCInvokeIdSetTCInvokeIdSet  
FROM TCAPMessages tc-Messages
```

.

```
| InvokeID ::= TCInvokeIdSetTCInvokeIdSet
```

**** NEXT MODIFIED SECTION ****

11.8 CallGap procedure

11.8.1 General description

This operation is used to request the gsmSSF to reduce the rate at which specific service requests are sent to the gsmSCF. For CAMEL, this operation could be sent only on a dialogue that has been opened by the gsmSSF by an InitialDP operation.

11.8.1.1 Parameters

- gapCriteria:

This parameter identifies the criteria for a call to be subject to call gapping. It consists of the following alternatives: basicGapCriteria or compoundGapCriteria:

- basicGapCriteria:

This parameter consists of:

- calledAddressValue:

This parameter indicates that call gapping shall be applied when the leading digits of the dialled number of a call attempt match those specified in "gapCriteria". The called address is the one received from the current call control.

- gapOnService:

This parameter indicates that call gapping shall be applied when the "serviceKeyserviceKey" of a call attempt match those specified in "gapCriteria".

- calledAddressAndService:

This parameter indicates that call gapping shall be applied when the "serviceKey" and the leading digits of the dialled number of a call attempt match those specified in "gapCriteria". The called address is the one received from the current call control.

- callingAddressAndService:

This parameter indicates that call gapping shall be applied when the "serviceKey" and the leading digits of the calling party number of a call attempt match those specified in "gapCriteria". In the case of call forwarding the calling address to be gapped is the redirecting number which would be put in the Initial DP operation.

- compoundGapCriteria:

This parameter consists of the following subparameters:

- basicGapCriteria:

This parameter is as described above.

- scfID:

-The means of identification of an gsmSCF. The scfID is to convey the necessary gsmSCF address information (e.g. Global Title) in the network to the requesting gsmSSF. See Q.713 "calling party address" parameter. The network operator has to decide about the actual mapping of this parameter on the used signalling system.

This parameter indicates the address of the gsmSCF, which initiated the call gapping.

When ~~scfID~~-scfID is used in an operation, which may cross an internetwork boundary, its encoding must be understood in both networks; this requires bilateral agreement on the encoding. If this parameter is not available the call gapping is not dedicated to a specific gsmSCF.

This subparameter is restricted to include a fixed GT address string.

Note: In the case where the GT addresses more than one SCP (e.g. a mated pair) then if one of these physical SCPs enters overload conditions and issues CallGap, then it is applied to all of them.

- gapIndicators:
This parameter indicates the gapping characteristics.
- duration:
Duration specifies the total time interval during which call gapping for the specified gap criteria will be active.

A duration of 0 indicates that gapping is to be removed.

A duration of -2 indicates a network specific duration.

Other values indicate duration in seconds. A duration of -1 shall not be used.
- gapInterval:
This parameter specifies the minimum time between calls being allowed through.

An interval of 0 indicates that calls meeting the gap criteria are not to be rejected.

An interval of -1 indicates that all calls meeting the gap criteria are to be rejected.

Other values indicate interval in milliseconds.
- controlType:
This parameter indicates the reason for activating call gapping.

The "controlType" value "sCPOverloaded" indicates that an automatic congestion detection and control mechanism in the SCP has detected a congestion situation.

The "controlType" value "manuallyInitiated" indicates that the service and or network/service management centre has detected a congestion situation, or any other situation that requires manually initiated controls.

NOTE: The controlType 'manuallyInitiated' will have priority over 'sCPOverloaded' call gap. It should be noted that also non-IN controlled traffic control mechanism can apply to an exchange with the SSF functionality. The non-IN controlled traffic control may also have some influence to the IN call. Therefore it is recommended to take measures to co-ordinate several traffic control mechanisms. The non-IN controlled traffic control and co-ordination of several traffic control mechanisms are out of the scope of ~~INAP~~ INAPCAP.
- gapTreatment:
This parameter indicates how calls that were stopped by the call gapping mechanism shall be treated.
- informationToSend:
(This Information Element is inherited from Play Announcement operation, only a subset is required for the Call Gap operation)
This parameter indicates an announcement, a tone or display information to be sent to the calling party. At the end of information sending, the call shall be released.
- inbandInfo:
This parameter specifies the inband information to be sent.
 - messageID:
This parameter indicates the message(s) to be sent, it can be one of the following:
 - elementaryMessageID:
This parameter indicates a single announcement.
 - duration:
This parameter indicates the maximum time duration in seconds that the message shall be played/repeated. ZERO indicates endless repetition.
 - tone:
This parameter specifies a tone to be sent to the end-user.
 - toneID:
This parameter indicates the tone to be sent.
 - duration:
This parameter indicates the time duration in seconds of the tone to be sent. ZERO indicates infinite duration.

- releaseCause:
If the call is to be released, this parameter indicates a specific cause value to be sent in the release message.
See EN 300 356-1 [8]

****** End of Document ******

6.1 gsmSSF/CCF - gsmSCF Interface

```

assistRequestInstructions {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      AssistRequestInstructionsArg {bound}
  RETURN RESULT FALSE
  ERRORS        {missingCustomerRecord |
                 missingParameter |
                 systemFailure |
                 taskRefused |
                 unexpectedComponentSequence |
                 unexpectedDataValue |
                 unexpectedParameter}
  CODE          opcode-assistRequestInstructions
}
-- Direction: gsmSSF -> gsmSCF or gsmSRF -> gsmSCF, Timer: Tari
-- This operation is used when there is an assist or a hand-off procedure and may be
-- sent by the gsmSSF or gsmSRF to the gsmSCF. This operation is sent by the
-- assisting gsmSSF to gsmSCF, when the initiating gsmSSF has set up a connection to
-- the gsmSRF or to the assisting gsmSSF as a result of receiving an
-- EstablishTemporaryConnection or Connect operation (in the case of hand-off) from
-- the gsmSCF.
-- Refer to clause 11 for a description of the procedures associated with this operation.

AssistRequestInstructionsArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  correlationID      [0] CorrelationID {bound},
  iPSSPCapabilities [2] IPSSPCapabilities {bound},
  extensions         [3] SEQUENCE SIZE(1..bound.&numOfExtensions) OF ExtensionField {bound}
                    OPTIONAL,
  ...
}
-- OPTIONAL denotes network operator specific use. The value of the correlationID may be the
-- Called Party Number supplied by the initiating gsmSSF.

callInformationReport {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      CallInformationReportArg {bound}
  RETURN RESULT FALSE
  ALWAYS RESPONDS FALSE
  CODE          opcode-callInformationReport
}
-- Direction: gsmSSF -> gsmSCF, Timer: Tcirp
-- This operation is used to send specific call information for a single call party to the gsmSCF
-- as
-- requested by the gsmSCF in a previous CallInformationRequest.

CallInformationReportArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  requestedInformationList [0] RequestedInformationList {bound},
  extensions               [2] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                          ExtensionField {bound} OPTIONAL,
  legID                   [3] ReceivingSideID OPTIONAL,
  ...
}

callInformationRequest {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      CallInformationRequestArg {bound}
  RETURN RESULT FALSE
  ERRORS        {missingParameter |
                 parameterOutOfRange |
                 requestedInfoError |
                 systemFailure |
                 taskRefused |
                 unexpectedComponentSequence |
                 unexpectedDataValue |
                 unexpectedParameter |
                 unknownLegID}
  CODE          opcode-callInformationRequest
}
-- Direction: gsmSCF -> gsmSSF, Timer: Tcirq
-- This operation is used to request the gsmSSF to record specific information about a single
-- call party and report it to the gsmSCF (with a CallInformationReport operation).

CallInformationRequestArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  requestedInformationTypeList [0] RequestedInformationTypeList {bound},
  extensions                   [2] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                          ExtensionField {bound} OPTIONAL,
  legID                       [3] SendingSideID
                          OPTIONAL,
  ...
}

```


-- OPTIONAL denotes network operator optional.

.

```
connect {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      ConnectArg {bound}
  RETURN RESULT FALSE
  ERRORS        {missingParameter |
                 parameterOutOfRange |
                 systemFailure |
                 taskRefused |
                 unexpectedComponentSequence |
                 unexpectedDataValue |
                 unexpectedParameter}
  CODE          opcode-connect
}
```

-- Direction: gsmSCF-> gsmSSF, Timer: Tcon

-- This operation is used to request the gsmSSF to perform the call processing actions
 -- to route or forward a call to a specified destination. ~~To do so, the gsmSSF may or~~
~~may not use destination information from the calling party (e.g. dialed digits),~~
~~depending on the information provided by the gsmSCF.~~
~~Call processing resumes at the Analyzed Information PIC in the O-BCSM.~~

```
ConnectArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  destinationRoutingAddress [0] DestinationRoutingAddress {bound},
  alertingPattern           [11] AlertingPattern OPTIONAL,
  originalCalledPartyID    [6] OriginalCalledPartyID {bound} OPTIONAL,
  extensions                [10] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                             ExtensionField {bound} OPTIONAL,
  carrier                   [11] Carrier {bound} OPTIONAL,
  callingPartysCategory    [28] CallingPartysCategory OPTIONAL,
  redirectingPartyID       [29] RedirectingPartyID {bound} OPTIONAL,
  redirectionInformation   [30] RedirectionInformation OPTIONAL,
  genericNumbers           [14] GenericNumbers {bound} OPTIONAL,
  serviceInteractionIndicatorsTwo [15] ServiceInteractionIndicatorsTwo OPTIONAL,
  chargeNumber             [19] ChargeNumber {bound} OPTIONAL,
  cug-Interlock            [31] CUG-Interlock OPTIONAL,
  cug-OutgoingAccess       [32] NULL OPTIONAL,
  suppressionOfAnnouncement [55] SuppressionOfAnnouncement OPTIONAL,
  oCSIApplicable           [56] OCSIApplicable OPTIONAL,
  naOliInfo                [57] NAOliInfo OPTIONAL,
  ...
}
```

-- na-Info is included at the discretion of the gsmSCF operator.

```
connectToResource {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      ConnectToResourceArg {bound}
  RETURN RESULT FALSE
  ERRORS        {missingParameter |
                 systemFailure |
                 taskRefused |
                 unexpectedComponentSequence |
                 unexpectedDataValue |
                 unexpectedParameter+
                 unknownLegID}
  CODE          opcode-connectToResource
}
```

-- Direction: gsmSCF -> gsmSSF, Timer: Tctr

-- This operation is used to connect a call from the gsmSSFP to the ~~physical entity~~
~~containing the gsmSRF.~~

-- Refer to clause 11 for a description of the procedures associated with this operation.

```
ConnectToResourceArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  resourceAddress CHOICE {
    ipRoutingAddress [0] IPRoutingAddress {bound},
    none              [3] NULL
  },
  extensions [4] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                ExtensionField {bound} OPTIONAL,
  serviceInteractionIndicatorsTwo [7] ServiceInteractionIndicatorsTwo OPTIONAL,
  ...
}
```

.

```
establishTemporaryConnection {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT      EstablishTemporaryConnectionArg {bound}
  RETURN RESULT FALSE
  ERRORS        {eTCFailed |
                 missingParameter |
                 systemFailure |
                 taskRefused |
                 unexpectedComponentSequence |
                 unexpectedDataValue |
                 unexpectedParameter+
                 unknownLegID}
  CODE          opcode-establishTemporaryConnection
}
```

```

    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tetc
-- This operation is used to create a connection to a resource for a limited period
-- of time (e.g. to play an announcement, to collect user information); it implies
-- the use of the assist procedure. Refer to clause 11 for a description of the
-- procedures associated with this operation.

EstablishTemporaryConnectionArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  assistingSSPIPRoutingAddress [0] AssistingSSPIPRoutingAddress {bound},
  correlationID [1] CorrelationID {bound} OPTIONAL,
  scfID [3] ScfID {bound} OPTIONAL,
  extensions [4] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
    ExtensionField {bound} OPTIONAL,
  carrier [5] Carrier {bound} OPTIONAL,
  serviceInteractionIndicatorsTwo [6] ServiceInteractionIndicatorsTwo OPTIONAL,
  naOliInfo [50] NAOliInfo OPTIONAL,
  chargeNumber [51] ChargeNumber {bound} OPTIONAL,
  ...
}

```

**** NEXT MODIFIED SECTION ****
--

6.2.1 gsmSCF/gsmSRF operations and arguments

```
CAP-gsmSCF-gsmSRF-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSCF-gsmSRF-ops-args(103) version3(2)}
```

```
DEFINITIONS IMPLICIT TAGS ::= BEGIN
```

```
-- This module contains the operations and operation arguments used for the
-- gsmSRF - gsmSCF interface, for the control of circuit switched calls.
```

```
-- The table in section 2.1 lists the specifications that contain the modules
-- that are used by CAP.
```

```
IMPORTS
```

```
OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects
```

```
opcode-playAnnouncement,
opcode-promptAndCollectUserInformation,
opcode-specializedResourceReport
FROM CAP-operationcodes operationcodes
```

```
CollectedInfo,
Digits {},
ExtensionField {},
InformationToSend {}
SendingSideID
FROM CAP-datatypes datatypes
```

**** NEXT MODIFIED SECTION ****

10.1.5 MissingCustomerRecord

10.1.5.1 General description

10.1.5.1.1 Error description

This error is sent by the gsmSCF to the gsmSSF, gprsSSF or the gsmSRF, if the SLP could not be found in the gsmSCF, because the required customer record does not exist, or the requested SLPI, indicated by the correlationID in "AssistRequestInstructions" does not exist anymore.

10.1.5.2 Operations gsmSSF→gsmSCF

AssistRequestInstructions

InitialDP

Procedures at invoking entity (gsmSSF)

A) Sending Operation

Precondition:	gsmSSF FSM state	Trigger processing or
	gsmSSF FSM state	Waiting for Instructions; in <u>the assistingSSP case of assist/hand off.</u>
Postcondition:	gsmSSF FSM state	Waiting for Instructions.
	gsmSSF FSM state	Waiting for Instructions; in <u>the assistingSSP case of assist/hand off.</u>

B) gsmSSF receives Error"MissingCustomerRecord"

Precondition:	gsmSSF FSM state	Waiting for Instructions or
	gsmSSF FSM state	Waiting for Instructions; in <u>the assistingSSP case of assist/hand off.</u>
Postcondition:	gsmSSF FSM state	Idle or
	gsmSSF FSM state	Idle; in <u>the assistingSSP case of assist/hand off.</u>

The GMSC/VMSC handles the call according to the Default Call Handling parameter of the valid CSI.

10.1.5.3 Operations gsmSRF→gsmSCF

AssistRequestInstructions

Procedures at invoking entity (gsmSRF)

A) Sending Operation

Precondition:	SRSM state	Connected.
Postcondition:	SRSM state	Connected.

B) gsmSRF receives Error"MissingCustomerRecord"

Precondition:	SRSM state	Connected.
Postcondition:	SRSM state	Idle.

gsmSRF initiated Disconnect.

10.1.5.4 Operations gprsSSF/gsmSSF→gsmSCF

SMS Related

InitialDPSMS

Procedures at invoking entity (gprsSSF/gsmSSF)

A) Sending Operation

Precondition: gprsSSF/gsmSSF state Waiting for Instructions.

Postcondition: gprsSSF/gsmSSF state Waiting for Instructions.

B) gprsSSF/gsmSSF receives Error"MissingCustomerRecord"

Precondition: gprsSSF/gsmSSF state Waiting for Instructions.

Postcondition: gprsSSF/gsmSSF state Idle.

10.1.5.5 Operations gprsSSF→gsmSCF

GPRS Related

InitialDPGPRS

Procedures at invoking entity (gprsSSF)

A) Sending Operation

Precondition: gprsSSF state Waiting for Instructions.

Postcondition: gprsSSF state Waiting for Instructions.

B) gprsSSF receives Error"MissingCustomerRecord"

Precondition: gprsSSF state Waiting for Instructions.

Postcondition: gprsSSF state Idle.

**** NEXT MODIFIED SECTION ****

10.1.15 UnknownLegID

10.1.15.1 General description

10.1.15.1.1 Error description

This error is used to indicate to the gsmSCF that a specific leg, indicated by the LegID parameter value in the operation, is unknown to the gsmSSF.

10.1.15.2 Operations gsmSCF→gsmSSF

Call Associated/Non Call Processing

ApplyCharging

CallInformationRequest

RequestReportBCSMEEvent

SendChargingInformation

~~Call Associated/Call Processing~~

~~ConnectToResource~~

~~EstablishTemporaryConnection~~

Refer to subclause 10.1.6 MissingParameter for the appropriate error procedures.

11.8 CallGap procedure

11.8.1 General description

This operation is used to request the gsmSSF to reduce the rate at which specific service requests are sent to the gsmSCF. For CAMEL, this operation could be sent only on a dialogue that has been opened by the SSF by an InitialDP operation.

11.8.1.1 Parameters

- gapCriteria:
This parameter identifies the criteria for a call to be subject to call gapping. It consists of the following alternatives: basicGapCriteria or compoundGapCriteria:
- basicGapCriteria:
This parameter consists of:
 - calledAddressValue:
This parameter indicates that call gapping shall be applied when the leading digits of the dialled number of a call attempt match those specified in "gapCriteria". The called address is the one received from the current call control.
 - gapOnService:
This parameter indicates that call gapping shall be applied when the "servicekey" of a call attempt match those specified in "gapCriteria".
 - calledAddressAndService:
This parameter indicates that call gapping shall be applied when the "serviceKey" and the leading digits of the dialled number of a call attempt match those specified in "gapCriteria". The called address is the one received from the current call control.
 - callingAddressAndService:
This parameter indicates that call gapping shall be applied when the "serviceKey" and the leading digits of the calling party number of a call attempt match those specified in "gapCriteria". In the case of call forwarding the calling address to be gapped is the redirecting number which would be put in the Initial DP operation.
- compoundGapCriteria:
This parameter consists of the following subparameters:
 - basicGapCriteria:
This parameter is as described above.
 - scfID:
The means of identification of an gsmSCF. The scfID is to convey the necessary gsmSCF address information (e.g. Global Title) in the network to the requesting SSF. See Q.713 "calling party address" parameter. The network operator has to decide about the actual mapping of this parameter on the used signalling system.
This parameter indicates the address of the gsmSCF, which initiated the call gapping.
When ScfID is used in an operation, which may cross an internetwork boundary, its encoding must be understood in both networks; this requires bilateral agreement on the encoding. If this parameter is not available the call gapping is not dedicated to a specific gsmSCF.
This subparameter is restricted to include a fixed GT address string.
Note: In the case where the GT addresses more than one SCP (e.g. a mated pair) then if one of these physical SCPs enters overload conditions and issues CallGap, then it is applied to all of them.
- gapIndicators:
This parameter indicates the gapping characteristics.

- duration:
Duration specifies the total time interval during which call gapping for the specified gap criteria will be active.

A duration of 0 indicates that gapping is to be removed.

A duration of -2 indicates a network specific duration.

Other values indicate duration in seconds. A duration of -1 shall not be used.
 - gapInterval:
This parameter specifies the minimum time between calls being allowed through.

An interval of 0 indicates that calls meeting the gap criteria are not to be rejected.

An interval of -1 indicates that all calls meeting the gap criteria are to be rejected.

Other values indicate interval in milliseconds.
 - controlType:
This parameter indicates the reason for activating call gapping.

The "controlType" value "sCPOverloaded" indicates that an automatic congestion detection and control mechanism in the SCP has detected a congestion situation.

The "controlType" value "manuallyInitiated" indicates that the service and or network/service management centre has detected a congestion situation, or any other situation that requires manually initiated controls.
- NOTE: The controlType 'manuallyInitiated' will have priority over 'sCPOverloaded' call gap. It should be noted that also non-IN controlled traffic control mechanism can apply to an exchange with the SSF functionality. The non-IN controlled traffic control may also have some influence to the IN call. Therefore it is recommended to take measures to co-ordinate several traffic control mechanisms. The non-IN controlled traffic control and co-ordination of several traffic control mechanisms are out of the scope of INAP.
- gapTreatment:
This parameter indicates how calls that were stopped by the call gapping mechanism shall be treated.
 - informationToSend:
~~(This Information Element is inherited from Play Announcement operation, only a subset is required for the Call Gap operation)~~
This parameter indicates an announcement, or a tone or display information to be sent to the calling party. At the end of information sending, the call shall be released.
 - inbandInfo:
This parameter specifies the inband information to be sent.
 - messageID:
This parameter indicates the message(s) to be sent, it can be one of the following:
 - elementaryMessageID:
This parameter indicates a single announcement.
 - duration:
This parameter indicates the maximum time duration in seconds that the message shall be played/repeated. ZERO indicates endless repetition.
 - tone:
This parameter specifies a tone to be sent to the end-user.
 - toneID:
This parameter indicates the tone to be sent.
 - duration:
This parameter indicates the time duration in seconds of the tone to be sent. ZERO indicates infinite duration.

- releaseCause:
If the call is to be released, this parameter indicates a specific cause value to be sent in the release message.
See EN 300 356-1 [8]

****** End of Document ******

CHANGE REQUEST

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

29.078 CR 127 R1

Current Version: **3.5.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG CN#10**
 list expected approval meeting # here ↑

for approval
 for information

strategic
 non-strategic (for SMG 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 UTRAN / Radio Core Network

Source: Nokia **Date:** 16th Oct 2000

Subject: CAMEL3 ASN.1 reserved word "ms" replacement by "mobileStation"

Work item: CAMEL phase 3

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

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

Release:
 Phase 2
 Release 96
 Release 97
 Release 98
 Release 99
 Release 00

Reason for change:

Word "ms" is a reserved word in ASN.1 therefore it is replaced by "mobileStation". This does not affect to the bits on the CAP connection.

Clauses affected:

Other specs affected:

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

Other comments:

**** FIRST and LAST MODIFIED SECTION ****

5 Common CAP Types

5.1 Data types

....

```
InitiatingEntity ::= ENUMERATED {  
|   mmobileStation (0),  
   sgsn (1),  
   hlr (2),  
   ggsn (3)  
}
```

CHANGE REQUEST

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

29.078 CR 121r1

Current Version: **3.5.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **TSG CN#10**
list expected approval meeting # here ↑

for approval
for information

strategic
non-strategic (for SMG use only)

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

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

Source: Nokia **Date:** 17th Sep 2000

Subject: Correction to CAP3 GPRS-cause

Work item: CAMEL phase 3

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

Release: Phase 2
Release 96
Release 97
Release 98
Release 99
Release 00

Reason for change: The GPRS-cause in ReleaseGPRS and EntityReleaseGPRS CAP operations should not be the "cause" parameter of the GTP. The GTP cause is used to indicate type of the request, it is not always the reason for PDPc disconnection/failure. Some GTP causes have two values, one for request and one for response, e.g. MS refuses. In addition, GTP causes are not applicable to GPRS detach, they apply only to PDP context. When the SGSN releases towards the GGSN, the GTP_delete_PDP_context_request has no cause field. The SGSN can also release PDP context also because of an internal reason, or due to HLR location cancel.

Clauses affected:

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

Other comments: The cause code mapping to 24.008 reason codes towards the MS shall not be specified in CAP. Nokia proposes a lightweight specification work. The use of GMM and SM causes must be studied carefully by the SGSN vendor since some causes prevent retrials, some forces to retrial, and some causes are specified vague.

The following is a copy-paste from the 29.060, the GTP cause description. The causes are used in e.g. Create_Request and Create_Response operations:

7.7.1 Cause

In a request, the Cause Value indicates the reason for the request. The Cause shall be included in the request message.

In a response, the Cause Value indicates the acceptance or the rejection of the corresponding request. In addition, the Cause Value may indicate what was the reason for the corresponding request. The Cause value shall be included in the response message.

'Request accepted' is returned when a GSN has accepted a control plane request.

'Non-existent' indicates a non-existent or an inactive PDP context.

'IMSI not known' indicates a non-existent MM context.

'MS is GPRS Detached' indicates an idle MM context.

'MS is not GPRS Responding' and 'MS Refuses' may be used by SGSN to reject a Network-Requested PDP Context Activation.

'Version not supported' is returned when the recipient does not recognise the version number in the request message.

'Request IMSI', 'Request IMEI', 'Request IMSI and IMEI' and 'No identity needed' are used by GGSN to notify SGSN what to do.

'No resources available' is a generic temporary error condition e.g. all dynamic PDP addresses occupied or no memory available.

'Service not supported' is a generic error indicated that the GSN do not support the requested service.

'User authentication failed' indicates that the external packet network has rejected the user's service request.

'System failure' is a generic permanent error condition.

'Roaming restriction' indicates that the SGSN cannot activate the requested PDP context because of the roaming restrictions.

'P-TMSI Signature mismatch' is returned if either:

- the P-TMSI Signature stored in the old SGSN does not match the value sent by the MS via the new SGSN
- or the MS does not provide the P-TMSI Signature to the new SGSN while the old SGSN has stored the P-TMSI Signature for that MS.

'Semantic error in the TFT operation', 'Syntactic error in the TFT operation', 'Semantic errors in packet filter(s)' and 'Syntactic errors in packet filters(s) are indications of abnormal cases involving TFTs. The abnormal TFT cases and the use of the cause codes are defined in 3G TS 24.008.

'Invalid message format', 'Mandatory IE incorrect', 'Mandatory IE missing' and 'Optional IE incorrect' are indications of protocol errors described in the section Error handling.

'GPRS connection suspended' indicates that the GPRS activities of the mobile station are suspended.

'Authentication failure' indicates that the user authentication failed in the new SGSN.

'Context not found' indicates that the PDP Context referenced in an Active Secondary Context Request message was not found in the receiving GGSN.

'Relocation failure' indicates that the SRNS relocation failed in the new SGSN side.

'Unknown mandatory extension header' signals in a response message that the corresponding request included an extension header for which comprehension was required but unknown to the receiving end.

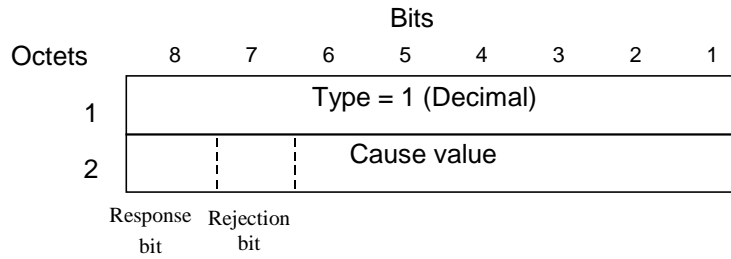


Figure 9: Cause information element

Table 38: Cause Values

Cause		Value (Decimal)		
request		Request IMSI	0	
		Request IMEI	1	
		Request IMSI and IMEI	2	
		No identity needed	3	
		MS Refuses	4	
		MS is not GPRS Responding	5	
		For future use	6-48	
	Cause values reserved for GPRS charging protocol use (see GTP' in GSM 12.15)	49-63		
For future use		64-127		
response	acc	Request accepted	128	
		For future use	129-176	
		Cause values reserved for GPRS charging protocol use (see GTP' in GSM 12.15)	177-191	
	rej		Non-existent	192
			Invalid message format	193
			IMSI not known	194
			MS is GPRS Detached	195
			MS is not GPRS Responding	196
			MS Refuses	197
			Version not supported	198
			No resources available	199
			Service not supported	200
			Mandatory IE incorrect	201
			Mandatory IE missing	202
			Optional IE incorrect	203
			System failure	204
			Roaming restriction	205
			P-TMSI Signature mismatch	206
			GPRS connection suspended	207
			Authentication failure	208
			User authentication failed	209
			Context not found	210
			All dynamic PDP addresses are occupied	211
			No memory is available	212
			Relocation failure	213
			Unknown mandatory extension header	214
			Semantic error in the TFT operation	215
		Syntactic error in the TFT operation	216	
		Semantic errors in packet filter(s)	217	
		Syntactic errors in packet filter(s)	218	
		Missing or unknown APN	219	
		Unknown PDP address or PDP type	220	
		For future use	221-240	
	Cause values reserved for GPRS charging protocol use (see GTP' in GSM 12.15)	241-255		

NOTE: With this coding, bits 8 and 7 of the Cause Value respectively indicate whether the message was a request or a response, and whether the request was accepted or rejected.

Table 39: Use of the Cause Values

Cause 8	value bits 7	Result
0	0	Request
0	1	For future use (Note)
1	0	Acceptance
1	1	Rejection

NOTE: The value '01' is for future use and shall not be sent. If received in a response, it shall be treated as a rejection.

**** For Your Information ****

The following is a copy-paste from the 3G TS 24.008. The GMM cause values are used for GPRS mobility management purposes.

Table 10.5.147/TS 24.008: GMM cause information element

Cause value (octet 2)								
Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	1	0	IMSI unknown in HLR
0	0	0	0	0	0	1	1	Illegal MS
0	0	0	0	0	1	1	0	Illegal ME
0	0	0	0	0	1	1	1	GPRS services not allowed
0	0	0	0	1	0	0	0	GPRS services and non-GPRS services not allowed
0	0	0	0	1	0	0	1	MS identity cannot be derived by the network
0	0	0	0	1	0	1	0	Implicitly detached
0	0	0	0	1	0	1	1	PLMN not allowed
0	0	0	0	1	1	0	0	Location Area not allowed
0	0	0	0	1	1	0	1	Roaming not allowed in this location area
0	0	0	1	0	0	0	0	MSC temporarily not reachable
0	0	0	1	0	0	0	1	Network failure
0	0	0	1	0	1	0	0	MAC failure
0	0	0	1	0	1	0	1	Synch failure
0	0	0	1	0	1	1	0	Congestion
0	0	1	0	1	0	0	0	No PDP context activated
0	0	1	1	0	0	0	0	}
			to					}
0	0	1	1	1	1	1	1	}
0	1	0	1	1	1	1	1	Semantically incorrect message
0	1	1	0	0	0	0	0	Invalid mandatory information
0	1	1	0	0	0	0	1	Message type non-existent or not implemented
0	1	1	0	0	0	1	0	Message type not compatible with the protocol state
0	1	1	0	0	0	1	1	Information element non-existent or not implemented
0	1	1	0	0	1	0	0	Conditional IE error
0	1	1	0	0	1	0	1	Message not compatible with the protocol state
0	1	1	0	1	1	1	1	Protocol error, unspecified

Any other value received by the mobile station shall be treated as 0110 1111, 'Protocol error, unspecified'. Any other value received by the network shall be treated as 0110 1111, 'Protocol error, unspecified'.

NOTE: The listed reject cause values are defined in Annex G.

The SM cause values are used for PDP context purposes.

Table 10.5.157/TS 24.008: SM cause information element

Cause value (octet 2)	
Bits	
8	7 6 5 4 3 2 1
0 0 0 1 1 0 0 1	LLC or SNDCP failure(GSM only)
0 0 0 1 1 0 1 0	Insufficient resources
0 0 0 1 1 0 1 1	Missing or unknown APN
0 0 0 1 1 1 0 0	Unknown PDP address or PDP type
0 0 0 1 1 1 0 1	User Authentication failed
0 0 0 1 1 1 1 0	Activation rejected by GGSN
0 0 0 1 1 1 1 1	Activation rejected, unspecified
0 0 1 0 0 0 0 0	Service option not supported
0 0 1 0 0 0 0 1	Requested service option not subscribed
0 0 1 0 0 0 1 0	Service option temporarily out of order
0 0 1 0 0 0 1 1	NSAPI already used (not sent)
0 0 1 0 0 1 0 0	Regular deactivation
0 0 1 0 0 1 0 1	QoS not accepted
0 0 1 0 0 1 1 0	Network failure
0 0 1 0 0 1 1 1	Reactivation required
0 0 1 0 1 0 0 1	Semantic error in the TFT operation
0 0 1 0 1 0 1 0	Syntactical error in the TFT operation
0 0 1 0 1 0 1 1	Unknown PDP context
0 0 1 0 1 1 1 0	PDP context without TFT already activated
0 0 1 0 1 1 0 0	Semantic errors in packet filter(s)
0 0 1 0 1 1 0 1	Syntactical errors in packet filter(s)
0 1 0 1 0 0 0 1	Invalid transaction identifier value
0 1 0 1 1 1 1 1	Semantically incorrect message
0 1 1 0 0 0 0 0	Invalid mandatory information
0 1 1 0 0 0 0 1	Message type non-existent or not implemented
0 1 1 0 0 0 1 0	Message type not compatible with the protocol state
0 1 1 0 0 0 1 1	Information element non-existent or not implemented
0 1 1 0 0 1 0 0	Conditional IE error
0 1 1 0 0 1 0 1	Message not compatible with the protocol state
0 1 1 0 1 1 1 1	Protocol error, unspecified

Any other value received by the mobile station shall be treated as 0010 0010, 'Service option temporarily out of order'. Any other value received by the network shall be treated as 0110 1111, 'Protocol error, unspecified'.

NOTE: The listed cause values are defined in Annex I

****** FIRST and LAST MODIFIED SECTION 5.1 ******

```
GPRSCause {PARAMETERS-BOUND : bound}          ::= OCTET STRING (SIZE(1
))
-- 00000000 Unspecified
-- All other values shall be interpreted as "Unspecified".
--
-- This parameter indicates the cause for CAP interface related information.
-- The GPRSCause mapping to/from GTP cause values specified in the 3G TS 29.060 and
-- to/from 3G TS 24.008 GMM cause and SM cause values are outside scope of this document.
-- Refer to 3G TS 29.060 [43] Cause parameter for encoding.
```


5 Common CAP Types

5.1 Data types

```

LocationInformationGPRS ::= SEQUENCE {
    cellGlobalIdOrServiceAreaIdOrLAI [0] OCTET STRING (SIZE(5..7)) OPTIONAL,
    routingAreaIdentity [1] OCTET STRING (SIZE(5..7)) RAIdentity OPTIONAL,
    geographicalInformation [2] OCTET STRING (SIZE (8)) OPTIONAL,
    sgsn-Number [3] ISDN-AddressString OPTIONAL,
    selectedLSAIdentity [4] LSAIdentity OPTIONAL,
    extensionContainer [5] ExtensionContainer OPTIONAL,
    ...
}
-- CellGlobalIdOrServiceAreaIdOrLAI and LSAIdentity are coded in accordance with
-- 3G TS 29.002 [13].
-- RoutingAreaIdentity is coded in accordance with 3G TS 29.060 [43].
-- RoutingAreaCode is coded in accordance with 3G TS 23.003 [49].
-- GeographicalInformation refers to geographical Information as defined
-- in 3G TS 23.032 [44].
. . .

RAIdentity ::= OCTET STRING (SIZE (7))
-- Routing Area Identity coded according to 3G TS 29.060 [43].
. . .

```

**** NEXT MODIFIED SECTION ****

8 GPRS Control

8.1 gsmSCF/gprsSSF operations and arguments

.....

```

InitialDPGPRSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                [0] ServiceKey,
    gPRSEventType             [1] GPRSEventType,
    mSISDN                    [2] ISDN-AddressString,
    iMSI                      [3] IMSI,
    timeAndTimeZone           [4] TimeAndTimezone {bound},
    gPRSMSCClass              [5] GPRSMSCClass                OPTIONAL,
    pDPType                   [6] PDPTYPE                    OPTIONAL,
    qualityOfService          [7] QualityOfService            OPTIONAL,
    accessPointName           [8] AccessPointName{bound}      OPTIONAL,
    routingAreaIdentity       [9] RAIdentity                  OPTIONAL,

    chargingID                [10] GPRSChargingID              OPTIONAL,
    sGSNCapabilities          [11] SGSNCapabilities            OPTIONAL,
    locationInformationGPRS    [12] LocationInformationGPRS    OPTIONAL,
    pDPInitiationType         [13] PDPInitiationType           OPTIONAL,
    extensions                 [14] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                ExtensionField {bound}          OPTIONAL,
    ...
}

```

```

-- The RoutingAreaIdentity parameter is not used.
-- The receiving entity shall ignore RoutingAreaIdentity if received.
-- The RoutingAreaIdentity is conveyed in the LocationInformationGPRS parameter.

```


Reason for change:

The description on the charging constraints between the basic optimal routing and the call forwarding in 23.079 (chapter 9.1) provides the criteria to perform the optimal routing. If none of the criteria met, no optimal routing is done (use the reference address instead).

This means the CAMEL interaction shall end and the dialogue between the gsmSSF and the gsmSCF shall also be terminated.

The latest specifications fail the above handling.

Example

Starting at the procedure Obtain_Routing_address (23.018) and assume that the procedure CAMEL_MT_GMSC_INIT (23.078) delivers the result "CAMEL_FTN", the problem occurs if DP T_Busy is armed as EDP-N, then;

- (1) the procedure Route_Permitted (23.079) delivers the output "False",
- (2) the procedure Obtains_Routing_Address (23.018) calls CAMEL_MT_GMSC_DISC4.
- (3) the procedure CAMEL_MT_GMSC_DISC4 sends Int_DP_T_Busy.
- (4) the process gsmSSF sends CAP_EventReportBCSM (T_Busy, interrupted) to the gsmSCF,
- (5) the gsmSCF may send any operation to the gsmSSF.
- (6) no matter what the destination address, if any, in the previous operation, the procedure Obtains_Routing_Address (23.018) ignores it.

(6) is ok, but the dialogue between the gsmSSF and the gsmSCF is still alive.

Especially after the step (4) the gsmSCF may try another number to connect and arm a DP, because the gsmSCF does not know no more CF is permitted.

To solve this problem, the series of CR propose;

- | | |
|--------|---|
| 23.078 | set additional IE, RouteNotPermitted, in Event Specific Information BCSM for T_Busy to indicate that the call forward shall be cancelled. |
| 29.078 | corresponding stage 3 |

First modified section in 5.1

```

EventSpecificInformationBCSM {PARAMETERS-BOUND : bound} ::= CHOICE {
  routeSelectFailureSpecificInfo [2] SEQUENCE {
    failureCause [0] Cause {bound} OPTIONAL,
    ...
  },
  oCalledPartyBusySpecificInfo [3] SEQUENCE {
    busyCause [0] Cause {bound} OPTIONAL,
    ...
  },
  oNoAnswerSpecificInfo [4] SEQUENCE {
    -- no specific info defined --
    ...
  },
  oAnswerSpecificInfo [5] SEQUENCE {
    destinationAddress [50] CalledPartyNumber {bound} OPTIONAL,
    or-Call [51] NULL OPTIONAL,
    forwardedCall [52] NULL OPTIONAL,
    ...
  },
  oDisconnectSpecificInfo [7] SEQUENCE {
    releaseCause [0] Cause {bound} OPTIONAL,
    ...
  },
  tBusySpecificInfo [8] SEQUENCE {
    busyCause [0] Cause {bound} OPTIONAL,
    callForwarded [50] NULL OPTIONAL,
    routeNotPermitted [51] NULL OPTIONAL,
    ...
  },
  tNoAnswerSpecificInfo [9] SEQUENCE {
    callForwarded [50] NULL OPTIONAL,
    ...
  },
  tAnswerSpecificInfo [10] SEQUENCE {
    destinationAddress [50] CalledPartyNumber {bound} OPTIONAL,
    or-Call [51] NULL OPTIONAL,
    forwardedCall [52] NULL OPTIONAL,
    ...
  },
  tDisconnectSpecificInfo [12] SEQUENCE {
    releaseCause [0] Cause {bound} OPTIONAL,
    ...
  }
}
-- Indicates the call related information specific to the event.

```


Next modified section in 11.24

11.24 EventReportBCSM procedure

11.24.1 General description

This operation is used to notify the gsmSCF of a call related event previously requested by the gsmSCF in a "RequestReportBCSMEvent" operation. The monitoring of more than one event could be requested with a "RequestReportBCSMEvent" operation, but each of these requested events is reported in a separate "EventReportBCSM" operation.

11.24.1.1 Parameters

- eventTypeBCSM:
This parameter specifies the type of event that is reported.
- eventSpecificInformationBCSM:
This parameter indicates the call related information specific to the event.

For "RouteSelectFailure" it will contain the "FailureCause", if available.

For "O-Busy" it will contain the "BusyCause", if available.

If the busy event is triggered by an ISUP release message, the BusyCause is a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.

If the Busy event is triggered by a MAP error, for example: Absent subscriber, received from the HLR, the MAP cause is mapped to the corresponding ISUP release cause.

NOTE 1: If no BusyCause is received, the gsmSCF shall assume busy.

For "T-Busy" it ~~may will~~ contain the following parameters "BusyCause", if available.

- CallForwarded
~~This parameter indicates that if the T-busy event is triggered by call forwarding at the GMSC/VMSC, the eventSpecificInformationBCSM will contain the CallForwarded indication.~~
- RouteNotPermitted
~~This parameter indicates that the T-busy event is triggered because call forwarding was not invoked in this GMSC due to the rules of basic optimal routing.~~ RoutePermitted indication.
- BusyCause
 - If the T-busy event is triggered by an ISUP release message, the BusyCause is a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.
 - If the T-busy event is triggered by a MAP error, for example: Absent subscriber, received from the HLR, the MAP cause is mapped to the corresponding ISUP release cause.
 - If the T-busy event is triggered by call forwarding invocation in the GMSC/VMSC the BusyCause will refer to the type of the call forwarding service according to the mapping table in 3G TS 23.078.

NOTE 2: If no BusyCause is received, the gsmSCF shall assume busy.

If the busy event is triggered by call forwarding at the GMSC, the BusyCause reflects the forwarding reason (Subscriber Absent, 20 or User busy, 17). The eventSpecificInformationBCSM will also contain the CallForwarded indication.

For O-NoAnswer it will be empty.

For T-NoAnswer it may contain the CallForwarded indication.

If the no answer event is triggered by an ISUP release message or expiry of the CAMEL timer TNRY, the eventSpecificInformationBCSM will be empty.

If the no answer event is triggered by call forwarding at the GMSC/VMSC, the eventSpecificInformationBCSM will contain the CallForwarded indication.

For O- or T-Answer it will contain the following information:

- The destination address for the call;
- The OR indicator if the call was subject to basic optimal routing as specified in 3G TS 23.079;
- The forwarding indicator if the Call Forwarding Supplementary Service was invoked.
- For O- or T-Disconnect it will contain the "releaseCause", if available.
- legID:
This parameter indicates the party in the call for which the event is reported. gsmSSF will use the option "ReceivingSideID" only.
- receivingSideID:
If not included, the following defaults are assumed:

"legID" = 1 for the events O-Abandon and T-Abandon,

"legID" = 2 for the events RouteSelectFailure, O-Busy, O-NoAnswer, O-Answer, T-Busy, T-NoAnswer, and T-Answer.

The "legID" parameter shall always be included for the events O-Disconnect and T-Disconnect.
- miscCallInfo:
This parameter indicates Detection Point (DP) related information.
- messageType:
This parameter indicates whether the message is a request, i.e. resulting from a "RequestReportBCSMEvent" with monitorMode = interrupted, or a notification, i.e. resulting from a "RequestReportBCSMEvent" with "monitorMode" = "notifyAndContinue".

CR-Form-v3

CHANGE REQUEST

⌘ **29.078 CR 131** ⌘ rev **-** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘ Correction of Apply Charging Report GPRS definition		
Source:	⌘ T-Mobil		
Work item code:	⌘ CAMEL3	Date:	⌘ 09.11.00
Category:	⌘ F	Release:	⌘ R99
Use <u>one</u> of the following categories: F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)	

Reason for change:	⌘ The events that may trigger start of time or volume count are not clearly specified. Current definition of the ACR GPRS parameters does not cover the scenario where a tariff switch occurs before the event that triggers time or volume count.
Summary of change:	⌘ Definition of events that may trigger time and volume count is introduced. The definition of the parameters of the ACR GPRS are modified to cope with the scenario where an early tariff switch was detected.
Consequences if not approved:	⌘ Pre Paid Services using AC/ACR will apply in certain scenarios the wrong tariff for cost calculation.

Clauses affected:	⌘ 11.6.1	
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘
Other comments:	⌘	

11.6 ApplyChargingReportGPRS procedure

11.6.1 General description

This operation is used by the gprsSSF to report charging related information to the gsmSCF as requested by the gsmSCF using the ApplyChargingGPRS operation.

~~Timing of duration and measuring of transferred data (if applicable) shall be started when either an Attach event, PDP context activation acknowledgement or an Inter SGSN routing area update acceptance is detected by the gprsSSF.~~

A report shall be made either when a PDP context deactivation, Detach event or Change in QoS is detected by the gprsSSF or when the gprsSSF detects that the transferred volume or elapsed time duration indicated in parameter transferredVolume or elapsedTime (received in ApplyChargingGPRS operation) has been reached.

That sending of ApplyChargingReportGPRS shall only be made on chargeable QoS changes, ~~i.e. normally upon MS initiated QoS changes.~~

~~The gprsSSF shall immediately restart timing duration and measuring transferred data for the GPRS Session or PDP Context for which the report was sent.~~

11.6.1.1 Parameters

- chargingResult:

This parameter provides the SCF with the charging related information previously requested using the ApplyChargingGPRS operation. The "ChargingResult" is a choice, and can contain either of the following parameters:

- transferredVolume:

This is a choice of the following parameters:

- volumeIfNoTariffSwitch:

This parameter will be present- if no tariff switch has occurred ~~for the PDP context, since the detection of the event that triggered volume count (e.g. PDP context activation acknowledgement) occurred otherwise it will be absent.~~ If present, then the volume transferred since ~~the detection of the event that triggered volume count event~~ will be reported.

- volumeIfTariffSwitch:

This parameter will be present- if a tariff switch has occurred ~~for the PDP context, since the detection of the event that triggered volume count (e.g. PDP context establishment acknowledgement) occurred otherwise it will be absent.~~ If present then the parameter may contain the following information:

- volumeSinceLastTariffSwitch:

The volume since the ~~detection of the event that triggered volume count or the~~ last tariffSwitch ~~(whichever of these events was last detected)~~ is reported.

- VolumeTariffSwitchInterval:

This parameter is present only if a tariff switch was detected ~~after the event that triggered volume count for the PDP context~~ in the current volume count period. If present, the volume between either the detection the event that triggered volume count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.

- elapsedTime:

This is a choice of the following parameters:

- timeGPRSIfNoTariffSwitch:

This parameter will be present- if no tariff switch has occurred ~~for the session or the PDP context, otherwise it will be absent~~ since the detection of ~~the event that triggered time count (e.g. attach) occurred.~~ If present then the elapsed time since the ~~detection of at the event that triggered time count~~ will be reported.

- timeGPRSIfTariffSwitch:

This parameter will be present- if a tariff switch has occurred ~~for the session or the PDP context, otherwise it will be absent~~ since the detection of ~~the event that triggered time count (e.g. attach) occurred.~~ If present then the parameter may contain the following information:

- timeGPRSSinceLastTariffSwitch:
The time since the [event that triggered time count or the](#) last tariffSwitch is reported.
- timeGPRSTariffSwitchInterval:
This parameter is present only if a tariff switch was detected [after the event that triggered time count for the session or PDP context](#) in the current time count period. If present, the time between either the detection the event that triggered time count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.
- qualityOfService:
This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN.
This parameter is only present when the sending of Apply Charging Report GPRS operation was triggered by a change in Quality of Service.
- active:
This parameter indicates whether the GPRS session or PDP context is still active
- pDPID:
This parameter, if present, identifies the PDP Context, within the Session dialogue, for which the charging report is valid.

Definition of LocationInformation in 29.002 for information

```

LocationInformation ::= SEQUENCE {
  ageOfLocationInformation      AgeOfLocationInformation      OPTIONAL,
  geographicalInformation       [0] GeographicalInformation   OPTIONAL,
  vlr-number                   [1] ISDN-AddressString         OPTIONAL,
  locationNumber               [2] LocationNumber             OPTIONAL,
  cellGlobalIdOrServiceAreaIdOrLAI [3] CellGlobalIdOrServiceAreaIdOrLAI OPTIONAL,
  extensionContainer           [4] ExtensionContainer          OPTIONAL,
  ... ,
  selectedLSA-Id               [5] LSAIdentity               OPTIONAL,
  msc-Number                   [6] ISDN-AddressString         OPTIONAL,
  geodeticInformation          [7] GeodeticInformation        OPTIONAL,
  currentLocationRetrieved     [8] NULL                       OPTIONAL,
  sai-Present                  [9] NULL                       OPTIONAL }
-- sai-Present indicates that the cellGlobalIdOrServiceAreaIdOrLAI parameter contains
-- a Service Area Identity.
-- currentLocationRetrieved shall be present
-- if the location information were retrieved after a successful paging.

```

Proposed change in “5.1 Data types”

```

LocationInformationGPRS ::= SEQUENCE {
  cellGlobalIdOrServiceAreaIdOrLAI [0] OCTET STRING (SIZE(5..7)) OPTIONAL,
  routingAreaIdentity              [1] OCTET STRING (SIZE(5..7)) OPTIONAL,
  geographicalInformation           [2] OCTET STRING (SIZE (8))   OPTIONAL,
  sgsn-Number                      [3] ISDN-AddressString        OPTIONAL,
  selectedLSAIdentity              [4] LSAIdentity               OPTIONAL,
  extensionContainer                [5] ExtensionContainer         OPTIONAL,
  ... ,
  sai-Present                    [6] NULL                       OPTIONAL
}
-- CellGlobalIdOrServiceAreaIdOrLAI and LSAIdentity are coded in accordance with
-- 3GPP TS 29.002 [13].
-- RoutingAreaIdentity is coded in accordance with 3GPP TS 29.060 [43].
-- RoutingAreaCode is coded in accordance with 3GPP TS 23.003 [49].
-- GeographicalInformation refers to geographical Information as defined
-- in 3GPP TS 23.032 [44].
-- sai-Present indicates that the cellGlobalIdOrServiceAreaIdOrLAI parameter contains
-- a Service Area Identity.

```

CHANGE REQUEST

⌘ **29.078 CR 135** ⌘ rev **1** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘ Introduction of GGSN Address		
Source:	⌘ T-Mobil		
Work item code:	⌘ CAMEL3	Date:	⌘ 14-Nov-00
Category:	⌘ F	Release:	⌘ R99
	<i>Use one of the following categories:</i> F (essential 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.		<i>Use one of the following releases:</i> 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:	⌘ The Charging ID is only unique together with the Address of the corresponding GGSN. The CAP 3 operations Initial DP GPRS and Event Report GPRS contain the charging ID but not the GGSN Address.
Summary of change:	⌘ The GGSN Address is introduced for the Initial DP GPRS and for the "Change Of Position PDP Context" and "PDP Context Establishment Acknowledge" of the Event Report GPRS.
Consequences if not approved:	⌘ The gsmSCF can not uniquely identify a PDP context by its charging ID. Correlation of PDP contexts with its corresponding CDRs is not possible. ☹

Clauses affected:	⌘ 5.1; 11.25.1; 8.1; 11.31.1	
Other specs affected:	⌘ <input checked="" type="checkbox"/> Other core specifications	⌘ 22.078, 23.078, 29.002
	<input type="checkbox"/> Test specifications	
	<input type="checkbox"/> O&M Specifications	
Other comments:	⌘	

5 Common CAP Types

5.1 Data types

-- The **Definition of Common Data Types** follows

```
CAP-datatypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-datatypes(52) version3(2)}
-- This module contains the type definitions for the CAP v.3 data types.
```

```
DEFINITIONS IMPLICIT TAGS ::= BEGIN
```

```
IMPORTS
```

```
    CallingPartysCategory,
    Duration,
    HighLayerCompatibility,
    Integer4,
    Interval,
    LegID,
    RedirectionInformation,
    ServiceKey
```

```
FROM CS1-DataTypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}
```

```
    BothwayThroughConnectionInd,
    CriticalityType,
    MiscCallInfo
```

```
FROM CS2-datatypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs2(20) modules(0) in-cs2-datatypes(0) version1(0)}
```

```
    IMSI,
    ISDN-AddressString,
    Ext-BasicServiceCode,
    NAEA-CIC
```

```
FROM MAP-CommonDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-network(1) modules(3) map-CommonDataTypes(18) version6(6)}
```

```
    Ext-QoS-Subscribed,
    GSN-Address,
    LocationInformation,
    QoS-Subscribed,
    SubscriberState
```

```
FROM MAP-MS-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-network(1) modules(3) map-MS-DataTypes(11) version6(6)}
```

```
    CallReferenceNumber,
    SuppressionOfAnnouncement
```

```
FROM MAP-CH-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-network(1) modules(3) map-CH-DataTypes(13) version6(6)}
```

```
    tc-Messages,
    classes
```

```
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}
```

```
    TCInvokeldSet
```

```
FROM TCAPMessages tc-Messages
```

```
    EXTENSION,
    PARAMETERS-BOUND,
    SupportedExtensions {}
```

```
FROM CAP-classes classes
```

```
;
```

```
AccessPointName {PARAMETERS-BOUND: bound} ::= OCTET STRING (SIZE(
    bound.&minAccessPointNameLength .. bound.&maxAccessPointNameLength))
-- Indicates the AccessPointName, refer to 3GPP TS 24.008 [12] for the encoding.
```

```

GenericNumbers {PARAMETERS-BOUND : bound} ::= SET SIZE(1..bound.&numOfGenericNumbers) OF
GenericNumber {bound}

GPRS-QoS ::= CHOICE {
  short-QoS-format [0] QoS-Subscribed,
  long-QoS-format [1] Ext-QoS-Subscribed
}
-- Short-QoS-format shall be sent for QoS in pre GSM release 99 format.
-- Long-QoS-format shall be sent for QoS in GSM release 99 (and beyond) format.
-- Which of the two QoS formats shall be sent is determined by which QoS
-- format is available in the SGSN at the time of sending.
-- Refer to 3GPP TS 29.002 [13] for encoding details of QoS-Subscribed and
-- Ext-QoS-Subscribed.

GPRSCause {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(1))
-- Indicates the cause for interface related information.
-- Refer to 3GPP TS 29.060 [43] Cause parameter for encoding.

GPRSChargingID ::= OCTET STRING (SIZE (4))
-- The Charging ID is a unique four octet value generated by the GGSN when
--- a PDP Context is activated. A Charging ID is generated for each activated context.

GPRSEvent ::= SEQUENCE {
  gPRSEventType [0] GPRSEventType,
  monitorMode [1] MonitorMode
}
-- Indicates the GPRS event information for monitoring.

GPRSEventSpecificInformation {PARAMETERS-BOUND : bound} ::= CHOICE {
  attachChangeOfPositionSpecificInformation
    [0] SEQUENCE {
      locationInformationGPRS [0] LocationInformationGPRS OPTIONAL
    },
  pdp-ContextchangeOfPositionSpecificInformation
    [1] SEQUENCE {
      accessPointName [0] AccessPointName {bound} OPTIONAL,
      chargingID [1] GPRSChargingID OPTIONAL,
      locationInformationGPRS [2] LocationInformationGPRS OPTIONAL,
      pdPType [3] PDPTYPE OPTIONAL,
      qualityOfService [4] QualityOfService OPTIONAL,
      timeAndTimeZone [5] TimeAndTimeZone OPTIONAL,
      gGSNAddress [6] GSN-Address OPTIONAL
    },
  detachSpecificInformation [2] SEQUENCE {
    inititatingEntity [0] InitiatingEntity OPTIONAL
  },
  disconnectSpecificInformation [3] SEQUENCE {
    inititatingEntity [0] InitiatingEntity OPTIONAL
  },
  pdPContextEstablishmentSpecificInformation
    [4] SEQUENCE {
      accessPointName [0] AccessPointName {bound} OPTIONAL,
      pdPType [1] PDPTYPE OPTIONAL,
      qualityOfService [2] QualityOfService OPTIONAL,
      locationInformationGPRS [3] LocationInformationGPRS OPTIONAL,
      timeAndTimeZone [4] TimeAndTimeZone OPTIONAL,
      pdPInitiationType [5] PDPInitiationType OPTIONAL
    },
  pdPContextEstablishmentAcknowledgementSpecificInformation
    [5] SEQUENCE {
      accessPointName [0] AccessPointName {bound} OPTIONAL,
      chargingID [1] GPRSChargingID OPTIONAL,
      pdPType [2] PDPTYPE OPTIONAL,
      qualityOfService [3] QualityOfService OPTIONAL,
      locationInformationGPRS [4] LocationInformationGPRS OPTIONAL,
      timeAndTimeZone [5] TimeAndTimeZone OPTIONAL,
      gGSNAddress [6] GSN-Address OPTIONAL
    }
}

PDPInitiationType ::= ENUMERATED {
  mSInitiated (0),
  networkInitiated (1)
}

```

8 GPRS Control

8.1 gsmSCF/gprsSSF operations and arguments

```
CAP-gprsSSF-gsmSCF-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-GPRS-ops-args(107) version3(2)}
```

```
DEFINITIONS IMPLICIT TAGS ::= BEGIN
```

```
-- This module contains the operations and operation arguments used for the
-- gprsSSF - gsmSCF interface, for the control of GPRS.
```

```
-- The table in section 2.1 lists the specifications that contain the modules
-- that are used by CAP.
```

```
IMPORTS
```

```
    errortypes,
    datatypes,
    operationcodes,
    classes,
    ros-InformationObjects
```

```
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}
```

```
OPERATION
```

```
FROM Remote-Operations-Information-Objects ros-InformationObjects
```

```
ServiceKey
```

```
FROM CS1-DataTypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}
```

```
MiscCallInfo
```

```
FROM CS2-datatypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs2(20) modules(0) in-cs2-datatypes (0) version1(0)}
```

```
IMSI,
```

```
ISDN-AddressString
```

```
FROM MAP-CommonDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CommonDataTypes(18) version6(6)}
```

```
GSN-Address
```

```
FROM MAP-MS-DataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-network(1) modules(3) map-MS-DataTypes(11) version6(6)}
```

```
PARAMETERS-BOUND
```

```
FROM CAP-classes classes
```

```
    opcode-activityTestGPRS,
    opcode-applyChargingGPRS,
    opcode-applyChargingReportGPRS,
    opcode-cancelGPRS,
    opcode-connectGPRS,
    opcode-continueGPRS,
    opcode-entityReleasedGPRS,
    opcode-eventReportGPRS,
    opcode-furnishChargingInformationGPRS,
    opcode-initialDPGPRS,
    opcode-releaseGPRS,
    opcode-requestReportGPRSEvent,
    opcode-resetTimerGPRS,
    opcode-sendChargingInformationGPRS
```

```
FROM CAP-operationcodes operationcodes
```

```

InitialDPGPRSEvent {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                [0] ServiceKey,
    gPRSEventType             [1] GPRSEventType,
    mSISDN                    [2] ISDN-AddressString,
    IMSI                       [3] IMSI,
    timeAndTimeZone           [4] TimeAndTimezone {bound},
    gPRSMSCClass              [5] GPRSMSCClass                OPTIONAL,
    pDPType                   [6] PDPTYPE                    OPTIONAL,
    qualityOfService          [7] QualityOfService            OPTIONAL,
    accessPointName           [8] AccessPointName{bound}       OPTIONAL,
    routingAreaIdentity       [9] RAIdentity                  OPTIONAL,
    chargingID                [10] GPRSCchargingID             OPTIONAL,
    SGSNCapabilities          [11] SGSNCapabilities            OPTIONAL,
    locationInformationGPRS    [12] LocationInformationGPRS    OPTIONAL,
    pDPInitiationType         [13] PDPInitiationType           OPTIONAL,
    extensions                 [14] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                ExtensionField {bound}         OPTIONAL,
    ...
    gGSNAddress               [15] GSN-Address                 OPTIONAL
}

```

```

releaseGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT
        ReleaseGPRSEvent {bound}
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        taskRefused |
        unknownPDPID
    }
    CODE opcode-releaseGPRS
}
-- Direction: gsmSCF -> gprsSSF, Timer: Trg
-- This operation is used to tear down an existing GPRS session or PDP Context at any phase.

```

```

ReleaseGPRSEvent {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    gprsCause                 [0] GPRSCause {bound},
    pDPID                     [1] PDPID OPTIONAL
}

```

```

requestReportGPRSEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT
        RequestReportGPRSEventArg {bound}
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        parameterOutOfRange |
        systemFailure |
        taskRefused |
        unexpectedComponentSequence |
        unexpectedDataValue |
        unexpectedParameter |
        unknownPDPID
    }
    CODE opcode-requestReportGPRSEvent
}

```

```

-- Direction: gsmSCF -> gprsSSF, Timer: Trrqe
-- This operation is used to request the gprsSSF to monitor for an event (e.g., GPRS events
-- such as attach or PDP Context activation), then send a notification back to the
-- gsmSCF when the event is detected.

```

```

RequestReportGPRSEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    gPRSEvent                 [0] SEQUENCE SIZE (1..bound.&numOfGPRSEvents) OF GPRSEvent,
    pDPID                     [1] PDPID                OPTIONAL
}

```

```

-- Indicates the GPRS related events for notification.

```

11.25 EventReportGPRS procedure

11.25.1 General description

This operation is used to notify the gsmSCF of a GPRS session or PDP context event previously requested by the gsmSCF in a RequestReportGPRSEvent operation. The monitoring of more than one event can be requested with a RequestReportGPRSEvent operation, but each of these requested events is reported in a separate EventReportGPRS operation.

11.25.1.1 Parameters

- gPRSEventType:
This parameter specifies the type of event that is reported.
- gPRSEventSpecificInformation:
This parameter indicates the GPRS session or PDP context related information specific to the event.
 - For Change of Position GPRS Session it shall contain the "locationInformationGPRS", if available.
 - For Change of Position PDP context it shall contain the "accessPointName", "chargingID", "locationInformationGPRS", "pDPType", Quality of Service and "timeAndTimeZone", "["gGSNAddress"](#)", if available.
 - For Detach and Disconnect it shall contain the "initiatingEntity".
 - For PDP context establishment it shall contain the "accessPointName", "pDPType", the "pDPInitiationType", the Quality of Service, "locationInformationGPRS" and "timeAndTimeZone", if available.
The Quality of Service shall contain the Requested QoS and the Subscribed QoS.
 - For PDP context establishment acknowledge it shall contain the "["accessPointName"](#)", "chargingID" "["pDPType"](#)", the Quality of Service, "["locationInformationGPRS"](#)" and "["timeAndTimeZone"](#)", "["gGSNAddress"](#)", if available.
The Quality of Service shall contain the Requested QoS, the Subscribed QoS and the Negotiated QoS.
- All optional gPRSEventSpecificInformation parameters shall be sent according to 3GPP TS 23.078 subclause 6.6.1.4 and 3GPP TS 22.078 annex "GPRS Information provided to the CSE".
- miscGPRSInfo:
This parameter contains DP related information.
- messageType:
This parameter indicates whether the message is a request, i.e. resulting from a RequestReportGPRSEvent with "monitorMode" = "interrupted", or a notification, i.e. resulting from a RequestReportGPRSEvent with "monitorMode" = "notifyAndContinue".
- pDPID:
This parameter, if present, identifies the PDP Context, within the Session dialogue, for which the event is reported.

11.31 InitialDPGPRS procedure

11.31.1 General description

This operation is used by the gprsSSF after detection of a TDP-R in the GPRS session or PDP context state machine, to request the gsmSCF for instructions to complete the GPRS session or PDP context.

For a GPRS Session, the 'Attach' and 'Change of Position Session' TDP's may result in the InitialDPGPRS Procedure.

For a PDP Context, the 'PDP Context Establishment', the 'PDP Context Establishment Acknowledgement' and the 'Change of Position Context' TDP's may result in the InitialDPGPRS Procedure.

If a PDP Context related TDP is met, and there is at that moment a GPRS dialogue for the GPRS Session, then the gprsSSF shall not initiate the InitialDPGPRS Procedure for that PDP Context.

If the 'PDP Context Establishment Acknowledgement' event occurs and this event is armed as a TDP, and there is at that moment a GPRS dialogue for the PDP Context, then the gprsSSF shall not initiate a new InitialDPGPRS Procedure for that PDP Context.

11.31.1.1 Parameters

- serviceKey:
This parameter indicates to the gsmSCF the requested IN service. It is used to address the required application/SLP within the gsmSCF (not for SCP addressing).
- gPRSEventType:
This parameter indicates the armed GPRS Attach/Detach SM or PDP Context SM DP event, resulting in the InitialDPGPRS operation.
- mSISDN:
MSISDN of the mobile subscriber for which the CAMEL service is invoked. For encoding see 3GPP TS 29.002 [13].
- iMSI:
IMSI of the mobile subscriber for which the CAMEL service is invoked. For encoding see 3GPP TS 29.002 [13].
- timeAndTimezone:
This parameter contains the time that the gprsSSF was triggered, and the time zone that the invoking gprsSSF resides in.
- gPRSMSCClass:
This parameter contains the MS Station capabilities of the mobile subscriber for which the CAMEL service is invoked.
 - MSNetworkCapabilities:
This parameter contains the Network Capabilities of the GPRS session.
 - MSRadioAccessCapabilities:
This parameter contains the Radio Access Capabilities of the MS.
- pDPTType:
This parameter identifies the PDP type and the actual PDP address.
- pDPTTypeOrganization:
The pDPTTypeOrganisation defines the organization that is responsible for the pDPTTypeNumber field and the PDP Address format, e.g. ETSI or an IETF type of address. For encoding see 3GPP TS 29.060 [43].
- pDPTTypeNumber:
The pDPTTypeNumber defines the end user protocol to be used between the external packet data network and the MS related to the pDPTTypeOrganization. For encoding see 3GPP TS 29.060 [43].

- pDPAddress:
This parameter is the address of the PDP context of the MS for which the CAMEL service is invoked for, that identifies the MS from the external packet data network. For encoding see 3GPP TS 29.060 [43].
- qualityOfService:
This parameter contains the Quality of Service.
If the InitialDPGPRS operation is sent as a result of the 'PDP Context Establishment' TDP, then the Quality of Service parameter shall contain the Requested QoS and the Subscribed QoS.
If the InitialDPGPRS operation is sent as a result of the 'PDP Context Establishment Acknowledgement' TDP, then the Quality of Service parameter shall contain the Requested QoS, the Subscribed QoS and the Negotiated QoS.
- accessPointName:
This parameter contains the requested address that the MS for which the CAMEL service is invoked for wants to connect to. For encoding see 3GPP TS 29.060 [43].
- routingAreaIdentity:
This parameter contains the location information of the MS for which the CAMEL service is invoked from. For encoding see 3GPP TS 29.060 [43].
- chargingID:
This parameter contains the charging ID that uniquely identifies together with the gGSNAddress the PDP context for the MS for which the CAMEL service is invoked from. For encoding see 3GPP TS 32.015.
- sGSNcapabilities:
This parameter specifies the capabilities which the SGSN node can provide for the CAMEL service control.
- locationInformationInSGSN:
This parameter indicates the location of the sending MS.
- pDPInitiationType:
This parameter indicates whether a PDP context was established as a result of a network-initiated request or as a result of a subscriber request.
- gGSNAddress:
This parameter refers to the IP address of the GGSN where the PDP context terminates. It is used together with the chargingID for uniquely identification of the PDP context for which the CAMEL service is invoked from. For encoding see 3G TS 23.003.

11.31.2 Invoking entity (gprsSSF)

11.31.2.1 Normal procedure

gprsSSF preconditions:

- (1) An event has been met that is armed as TDP.
- (2) There is no GPRS dialogue active for that PDP Context or for the GPRS Session.

gprsSSF postcondition:

- (1) A control relationship has been established and the gprsSSF is in state "waiting for instructions".

The address of the gsmSCF that the InitialDPGPRS operation shall be sent to is fetched from the valid CSI. The gprsSSF provides all available parameters.

The gprsSSF shall memorise the address of the response message and use it in the future TCAP dialogues.

A control relationship is established with the gsmSCF. The gprsSSF application timer T_{SSF} is set when the gprsSSF sends InitialDPGPRS for requesting instructions from the gsmSCF. It is used to prevent from excessive GPRS session or PDP context duration or volume usage.

CR-Form-v3

CHANGE REQUEST

⌘ **29.078 CR 136** ⌘ rev **1** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘ Introduction of ellipsis for GPRS CAPv3		
Source:	⌘ Nokia		
Work item code:	⌘ CAMEL3	Date:	⌘ 14 th of Nov 2000
Category:	⌘ F	Release:	⌘ R99
<p>Use <u>one</u> of the following categories:</p> <p>F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p>	

Reason for change:	⌘ The ellipsis ASN.1 notation allows adding of parameters and fields afterwards in a backward compatible manner. This may become important especially in CAMEL4 time frame – individual correction can be done without raising application context version. The parameters after the ellipsis are ignored by the receiving entity if not recognized. However, the parameters before / without ellipsis must be recognized by the receiving entity, otherwise rejected.
Summary of change:	⌘
Consequences if not approved:	⌘

Clauses affected:	⌘		
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
Other comments:	⌘		

5 Common CAP Types

5.1 Data types

-- The Definition of Common Data Types follows

```
CAMEL-FCIBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE{
  fCIBCCAMELsequence1 [0] SEQUENCE {
    freeFormatData [0] OCTET STRING (SIZE(
      bound.&minFCIBillingChargingDataLength .. bound.&maxFCIBillingChargingDataLength)),
    partyToCharge [1] SendingSideID
      DEFAULT sendingSideID : leg1,
    appendFreeFormatData [2] AppendFreeFormatData DEFAULT overwrite
  }
}
```

```
CAMEL-FCIGPRSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= SEQUENCE{
  fCIBCCAMELsequence1 [0] SEQUENCE {
    freeFormatData [0] OCTET STRING (SIZE(
      bound.&minFCIBillingChargingDataLength .. bound.&maxFCIBillingChargingDataLength)),
    pDPID [1] PDPID OPTIONAL,
    appendFreeFormatData [2] AppendFreeFormatData DEFAULT overwrite,
    ...
  }
}
```

```
CAMEL-FCISMSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE{
  fCIBCCAMELsequence1 [0] SEQUENCE {
    freeFormatData [0] OCTET STRING (SIZE(
      bound.&minFCIBillingChargingDataLength .. bound.&maxFCIBillingChargingDataLength)),
    appendFreeFormatData [1] AppendFreeFormatData DEFAULT overwrite
  }
}
```

```
CAMEL-SCIBillingChargingCharacteristics ::= CHOICE {
  aOCBeforeAnswer [0] AOCBeforeAnswer,
  aOCAfterAnswer [1] AOCSubsequent
}
```

```
CAMEL-SCIGPRSBillingChargingCharacteristics ::= SEQUENCE {
  aOCGPRS [0] AOCGPRS,
  pDPID [1] PDPID OPTIONAL,
  ...
}
```

```
GPRSEvent ::= SEQUENCE {
  gPRSEventType [0] GPRSEventType,
  monitorMode [1] MonitorMode
}
```

-- Indicates the GPRS event information for monitoring.

```
GPRSEventSpecificInformation {PARAMETERS-BOUND : bound} ::= CHOICE {
  attachChangeOfPositionSpecificInformation [0] SEQUENCE {
    locationInformationGPRS [0] LocationInformationGPRS OPTIONAL,
    ...
  },
  pdp-ContextchangeOfPositionSpecificInformation [1] SEQUENCE {
    accessPointName [0] AccessPointName {bound} OPTIONAL,
    chargingID [1] GPRSChargingID OPTIONAL,
    locationInformationGPRS [2] LocationInformationGPRS OPTIONAL,
    pDPType [3] PDPTType OPTIONAL,
    qualityOfService [4] QualityOfService OPTIONAL,
    timeAndTimeZone [5] TimeAndTimeZone OPTIONAL,
    ...
  },
  detachSpecificInformation [2] SEQUENCE {
```

```

        inititatingEntity          [0] InitiatingEntity          OPTIONAL,
        ...
    },
    disconnectSpecificInformation  [3] SEQUENCE {
        inititatingEntity          [0] InitiatingEntity          OPTIONAL,
        ...
    },
    pdpContextEstablishmentSpecificInformation
        [4] SEQUENCE {
        accessPointName            [0] AccessPointName {bound} OPTIONAL,
        pdpType                    [1] PDPType                    OPTIONAL,
        qualityOfService           [2] QualityOfService          OPTIONAL,
        locationInformationGPRS     [3] LocationInformationGPRS   OPTIONAL,
        timeAndTimeZone            [4] TimeAndTimeZone          OPTIONAL,
        pdpInitiationType          [5] PDPInitiationType        OPTIONAL,
        ...
    },
    pdpContextEstablishmentAcknowledgementSpecificInformation
        [5] SEQUENCE {
        accessPointName            [0] AccessPointName {bound} OPTIONAL,
        chargingID                 [1] GPRSChargingID           OPTIONAL,
        pdpType                    [2] PDPType                    OPTIONAL,
        qualityOfService           [3] QualityOfService          OPTIONAL,
        locationInformationGPRS     [4] LocationInformationGPRS   OPTIONAL,
        timeAndTimeZone            [5] TimeAndTimeZone          OPTIONAL,
        ...
    }
}

PDPInitiationType ::= ENUMERATED {
    mSInitiated          (0),
    networkInitiated     (1)
}

GPRSEventType ::= ENUMERATED {
    attach                (1),
    attachChangeOfPosition (2),
    detached              (3),
    pdp-ContextEstablishment (11),
    pdp-ContextEstablishmentAcknowledgement (12),
    disonnect             (13),
    pdp-ContextChangeOfPosition (14)
}

GPRSMSCClass ::= SEQUENCE {
    mSNetworkCapability [0] MSNetworkCapability,
    mSRadioAccessCapability [1] MSRadioAccessCapability
}
-- GPRS MS class mark describes the terminal capabilities.
-- For encoding refer to 3GPP TS 24.008 [12].

LocationInformationGPRS ::= SEQUENCE {
    cellGlobalIdOrServiceAreaIdOrLAI [0] OCTET STRING (SIZE(5..7)) OPTIONAL,
    routingAreaIdentity [1] OCTET STRING (SIZE(5..7)) OPTIONAL,
    geographicalInformation [2] OCTET STRING (SIZE (8)) OPTIONAL,
    sgsn-Number [3] ISDN-AddressString OPTIONAL,
    selectedLSAIdentity [4] LSAIdentity OPTIONAL,
    extensionContainer [5] ExtensionContainer OPTIONAL,
    ...
}
-- CellGlobalIdOrServiceAreaIdOrLAI and LSAIdentity are coded in accordance with
-- 3GPP TS 29.002 [13].
-- RouteinAreaIdentity is coded in accordance with 3GPP TS 29.060 [43].
-- RoutingAreaCode is coded in accordance with 3GPP TS 23.003 [49].
-- GeographicalInformation refers to geographical Information as defined
-- in 3GPP TS 23.032 [44].

PDPType {PARAMETERS-BOUND: bound} ::= SEQUENCE {
    pdpTypeOrganization [0] OCTET STRING (SIZE(1)),
    pdpTypeNumber [1] OCTET STRING (SIZE(1)),
    PDPAddress [2] OCTET STRING (SIZE(
        bound.&minPDPAddressLength .. bound.&maxPDPAddressLength)) OPTIONAL
}
-- Indicates the PDPType, refer to 3GPP TS 29.060 for the encoding.
-- The pdpTypeOrganization shall use the least significant 4 bits of the octet encoded.

```

-- The sender of this parameter shall set the most significant 4 bit of the octet to 0.
 -- The receiver of this parameter shall ignore the most significant 4 bits of this octet.

```
QualityOfService ::= SEQUENCE {
  requested-QoS [0] GPRS-QoS OPTIONAL,
  subscribed-QoS [1] GPRS-QoS OPTIONAL,
  negotiated-QoS [2] GPRS-QoS OPTIONAL,
  ...
}
```

-- The procedure descriptions in chapter 11 indicate which one(s) of the
 -- QoS variables shall be transported.

```
RAIdentity ::= OCTET STRING (SIZE (7))
-- Routing Area Identity coded according to 3GPP TS 29.060 [43].
```

```
SCIGPRSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE (
  bound.&minSCIBillingChargingLength .. bound.&maxSCIBillingChargingLength))
(CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
  CAMEL-SCIGPRSBillingChargingCharacteristics})
-- Indicates AOC information to be sent to a Mobile Station
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.
```

```
TransferredVolume ::= CHOICE {
  volumeIfNoTariffSwitch [0] INTEGER (0..4294967295),
  volumeIfTariffSwitch [1] SEQUENCE {
    volumeSinceLastTariffSwitch [0] INTEGER (0..4294967295),
    volumeTariffSwitchInterval [1] INTEGER (0..4294967295) OPTIONAL
  }
}
```

-- volumeIfNoTariffSwitch, volumeSinceLastTariffSwitch and volumeTariffSwitchInterval
 -- are measured in bytes.

```
ElapsedTime ::= CHOICE {
  timeGPRSIfNoTariffSwitch [0] INTEGER (0..86400),
  timeGPRSIfTariffSwitch [1] SEQUENCE {
    timeGPRSSinceLastTariffSwitch [0] INTEGER (0..86400),
    timeGPRSTariffSwitchInterval [1] INTEGER (0..86400)
  }
}
```

-- timeGPRSIfNoTariffSwitch is measured in seconds
 -- timeGPRSSinceLastTariffSwitch and timeGPRSTariffSwitchInterval are measured in seconds

8 GPRS Control

8.1 gsmSCF/gprsSSF operations and arguments

```
CAP-gprsSSF-gsmSCF-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-GPRS-ops-args(107) version3(2)}
```

```
DEFINITIONS IMPLICIT TAGS ::= BEGIN
```

```
-- This module contains the operations and operation arguments used for the
-- gprsSSF - gsmSCF interface, for the control of GPRS.
```

```
-- The table in section 2.1 lists the specifications that contain the modules
-- that are used by CAP.
```

```
IMPORTS
```

```
    errortypes,
    datatypes,
    operationcodes,
    classes,
    ros-InformationObjects
```

```
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}
```

```
OPERATION
```

```
FROM Remote-Operations-Information-Objects ros-InformationObjects
```

```
ServiceKey
```

```
FROM CS1-DataTypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}
```

```
MiscCallInfo
```

```
FROM CS2-datatypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs2(20) modules(0) in-cs2-datatypes (0) version1(0)}
```

```
IMSI,
```

```
ISDN-AddressString
```

```
FROM MAP-CommonDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CommonDataTypes(18) version6(6)}
```

```
PARAMETERS-BOUND
```

```
FROM CAP-classes classes
```

```
opcode-activityTestGPRS,
opcode-applyChargingGPRS,
opcode-applyChargingReportGPRS,
opcode-cancelGPRS,
opcode-connectGPRS,
opcode-continueGPRS,
opcode-entityReleasedGPRS,
opcode-eventReportGPRS,
opcode-furnishChargingInformationGPRS,
opcode-initialDPGPRS,
opcode-releaseGPRS,
opcode-requestReportGPRSEvent,
opcode-resetTimerGPRS,
opcode-sendChargingInformationGPRS
```

```
FROM CAP-operationcodes operationcodes
```

```
AccessPointName {},
GPRSCause {},
ChargingCharacteristics,
ChargingResult,
FCIGPRSBillingChargingCharacteristics,
GPRSChargingID,
GPRSEventSpecificInformation {},
GPRSEvent,
GPRSEventType,
GPRSMSCClass,
```

```

PDPID,
PDPTYPE,
QualityOfService,
RAIdentity,
SCIGPRSBillingChargingCharacteristics,
SGSNCapabilities,
TimeAndTimezone {},
TimerID,
TimerValue
FROM CAP-datatypes datatypes

```

```

missingCustomerRecord,
missingParameter,
parameterOutOfRange,
systemFailure,
taskRefused,
unexpectedComponentSequence,
unexpectedDataValue,
unexpectedParameter,
unknownPDPID
FROM CAP-errorTypes errorTypes

```

```
;
```

```

activityTestGPRS OPERATION ::= {
  RETURN RESULT TRUE
  CODE opcode-activityTestGPRS }
-- Direction: gsmSCF -> gprsSSF, Timer: Tatg
-- This operation is used to check for the continued existence of a relationship between the gsmSCF
-- and gprsSSF. If the relationship is still in existence, then the gprsSSF will respond. If no
-- reply is received, then the gsmSCF will assume that the gprsSSF has failed in some way
-- and will take the appropriate action.

```

```

applyChargingGPRS OPERATION ::= {
  ARGUMENT
    ApplyChargingGPRSArg
  RETURN RESULT FALSE
  ERRORS {
    missingParameter |
    unexpectedComponentSequence |
    unexpectedParameter |
    unexpectedDataValue |
    parameterOutOfRange |
    systemFailure |
    taskRefused |
    unknownPDPID
  }
  CODE opcode-applyChargingGPRS
}
-- Direction gsmSCF -> gprsSSF, Timer Tacg
-- This operation is used for interacting from the gsmSCF with the gprsSSF CSE-controlled
-- GPRS session or PDP Context charging mechanism.

```

```

ApplyChargingGPRSArg ::= SEQUENCE {
  chargingCharacteristics [0] ChargingCharacteristics,
  tariffsSwitchInterval [1] INTEGER (1..86400) OPTIONAL,
  pDPID [2] PDPID OPTIONAL,
  ...
}
-- tariffsSwitchInterval is measured in 1 second units.

```

```

applyChargingReportGPRS OPERATION ::= {
  ARGUMENT
    ApplyChargingReportGPRSArg
  RETURN RESULT TRUE
  ERRORS {
    missingParameter |
    unexpectedComponentSequence |
    unexpectedParameter |
    unexpectedDataValue |
    parameterOutOfRange |
    systemFailure |
    taskRefused |
    unknownPDPID
  }
  CODE opcode-applyChargingReportGPRS

```

```

}
-- Direction gprsSSF -> gsmSCF, Timer Tacrg
-- The ApplyChargingReportGPRS operation provides the feedback from the gprsSCF to the gsmSCF
-- CSE-controlled GPRS session charging mechanism.

```

```

ApplyChargingReportGPRSArg ::= SEQUENCE {
    chargingResult          [0] ChargingResult,
    qualityOfService        [1] QualityOfService OPTIONAL,
    active                  [2] BOOLEAN          DEFAULT TRUE,
    pDPID                   [3] PDPID           OPTIONAL,
    ...
}

```

```

cancelGPRS OPERATION ::= {
    ARGUMENT
        CancelGPRSArg
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        taskRefused |
        unknownPDPID
    }
    CODE opcode-cancelGPRS
}
-- Direction: gsmSCF -> gprsSSF, Timer: Tcag
-- This generic operation cancels all previous requests,
-- i.e. all EDPs and reports can be cancelled by the gsmSCF.

```

```

CancelGPRSArg ::= SEQUENCE {
    pDPID [0] PDPID OPTIONAL,
    ...
}

```

```

connectGPRS {PARAMETERS-BOUND: bound} OPERATION ::= {
    ARGUMENT ConnectGPRSArg {bound}
    RETURN RESULT FALSE
    ERRORS {missingParameter |
        parameterOutOfRange |
        unknownPDPID |
        systemFailure |
        taskRefused |
        unexpectedComponentSequence |
        unexpectedDataValue |
        unexpectedParameter}
    CODE opcode-connectGPRS
}
-- Direction: gsmSCF -> gprsSSF, Timer: Tcong
-- This operation is used to modify the Access Point Name used when establishing a PDP Context.

```

```

ConnectGPRSArg {PARAMETERS-BOUND: bound} ::= SEQUENCE {
    accessPointName [0] AccessPointName {bound},
    pdpID [1] PDPID OPTIONAL,
    ...
}

```

```

continueGPRS OPERATION ::= {
    ARGUMENT
        ContinueGPRSArg
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        unknownPDPID |
        unexpectedDataValue
    }
    CODE opcode-continueGPRS
}
-- Direction: gsmSCF -> gprsSSF, Timer: Tcueg
-- This operation is used to request the gprsSSF to proceed with processing at the DP at
-- which it previously suspended processing to await gsmSCF instructions (i.e., proceed to
-- the next point in processing in the Attach/Detach state model or PDP Context
-- state model) substituting new data from the gsmSCF.

```

```

ContinueGPRSArg ::= SEQUENCE {
    pDPID [0] PDPID OPTIONAL,
    ...
}

```

```

entityReleasedGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT
    EntityReleasedGPRSArg {bound}
  RETURN RESULT TRUE
  ERRORS {
    missingParameter |
    taskRefused |
    unknownPDPID
  }
  CODE opcode-entityReleasedGPRS
}
-- Direction: gprsSSF -> gsmSCF, Timer: Terg
-- This operation is used to notify the gsmSCF that a PDP Context has been
-- terminated abnormally in the SGSN.

EntityReleasedGPRSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  gPRSCause [0] GPRSCause {bound},
  pDPID [1] PDPID OPTIONAL,
  ...
}

eventReportGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT
    EventReportGPRSArg {bound}
  RETURN RESULT TRUE
  ERRORS {
    unknownPDPID
  }
  CODE opcode-eventReportGPRS
}
-- Direction gprsSSF -> gsmSCF, Timer Tereg
-- This operation is used to notify the gsmSCF of a GPRS session or PDP context related
-- events (e.g. PDP context activation) previously requested by the gsmSCF in a
-- RequestReportGPRSEventoperation.

EventReportGPRSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
  gPRSEventType [0] GPRSEventType,
  miscGPRSInfo [1] MiscCallInfo DEFAULT {messageType request},
  gPRSEventSpecificInformation [2] GPRSEventSpecificInformation {bound} OPTIONAL,
  pDPID [3] PDPID OPTIONAL,
  ...
}

furnishChargingInformationGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT FurnishChargingInformationGPRSArg {bound}
  RETURN RESULT FALSE
  ERRORS {missingParameter |
    taskRefused |
    unexpectedComponentSequence |
    unexpectedDataValue |
    unexpectedParameter |
    unknownPDPID
  }
  CODE opcode-furnishChargingInformationGPRS
}
-- Direction: gsmSCF -> gprsSSF, Timer: Tfcig
-- This operation is used to request the gprsSSF to generate, register a logical record or to
-- include some information in the default logical GPRS record.
-- The registered logical record is intended for off line charging of the GPRS session
-- or PDP Context.

FurnishChargingInformationGPRSArg {PARAMETERS-BOUND : bound} ::=
FCIGPRSBillingChargingCharacteristics{bound}

initialDPGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
  ARGUMENT
    InitialDPGPRSArg {bound}
  RETURN RESULT FALSE
  ERRORS {
    missingCustomerRecord |
    missingParameter |
    parameterOutOfRange |
    systemFailure |
    taskRefused |
    unexpectedComponentSequence |
    unexpectedDataValue |
    unexpectedParameter
  }
}

```

```

CODE opcode-initialDPGPRS
}

-- Direction gprsSSF -> gsmSCF, Timer: Tidpg
-- This operation is used by the gprsSSF when a trigger is detected at a DP in the GPRS state
-- machines to request instructions from the gsmSCF

InitialDPGPRSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                [0] ServiceKey,
    gPRSEventType             [1] GPRSEventType,
    mSISDN                    [2] ISDN-AddressString,
    IMSI                       [3] IMSI,
    timeAndTimeZone           [4] TimeAndTimezone {bound},
    gPRSMSCClass              [5] GPRSMSCClass OPTIONAL,
    pDPType                   [6] PDPTYPE OPTIONAL,
    qualityOfService          [7] QualityOfService OPTIONAL,
    accessPointName           [8] AccessPointName{bound} OPTIONAL,
    routingAreaIdentity       [9] RAIdentity OPTIONAL,
    chargingID                [10] GPRSChargingID OPTIONAL,
    sGSNCapabilities          [11] SGSNCapabilities OPTIONAL,
    locationInformationGPRS    [12] LocationInformationGPRS OPTIONAL,
    pDPInitiationType         [13] PDPInitiationType OPTIONAL,
    extensions                [14] SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                ExtensionField {bound} OPTIONAL,
    ...
}

releaseGPRS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT
        ReleaseGPRSArg {bound}
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        taskRefused |
        unknownPDPID
    }
    CODE opcode-releaseGPRS
}

-- Direction: gsmSCF -> gprsSSF, Timer: Trg
-- This operation is used to tear down an existing GPRS session or PDP Context at any phase.

ReleaseGPRSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    gprsCause                 [0] GPRSCause {bound},
    pDPID                     [1] PDPID OPTIONAL,
    ...
}

requestReportGPRSEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT
        RequestReportGPRSEventArg {bound}
    RETURN RESULT FALSE
    ERRORS {
        missingParameter |
        parameterOutOfRange |
        systemFailure |
        taskRefused |
        unexpectedComponentSequence |
        unexpectedDataValue |
        unexpectedParameter |
        unknownPDPID
    }
    CODE opcode-requestReportGPRSEvent
}

-- Direction: gsmSCF -> gprsSSF, Timer: Trrqe
-- This operation is used to request the gprsSSF to monitor for an event (e.g., GPRS events
-- such as attach or PDP Context activation), then send a notification back to the
-- gsmSCF when the event is detected.

RequestReportGPRSEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    gPRSEvent                 [0] SEQUENCE SIZE (1..bound.&numOfGPRSEvents) OF GPRSEvent,
    pDPID                     [1] PDPID OPTIONAL,
    ...
}

-- Indicates the GPRS related events for notification.

resetTimerGPRS OPERATION ::= {
    ARGUMENT

```



```

        ResetTimerGPRSArg
RETURN RESULT FALSE
ERRORS {
    missingParameter |
    parameterOutOfRange |
    taskRefused |
    unexpectedComponentSequence |
    unexpectedDataValue |
    unexpectedParameter |
    unknownPDPID
}
CODE opcode-resetTimerGPRS
}

-- Direction: gsmSCF -> gprsSSF, Timer: Trtg
-- This operation is used to request the gprsSSF to refresh an application timer in the gprsSSF.

ResetTimerGPRSArg ::= SEQUENCE {
    timerID [0] TimerID DEFAULT tssf,
    timerValue [1] TimerValue,
    ...
}

sendChargingInformationGPRS {PARAMETERS-BOUND: bound} OPERATION ::= {
    ARGUMENT SendChargingInformationGPRSArg { bound}
    RETURN RESULT FALSE
    ERRORS {missingParameter |
        unexpectedComponentSequence |
        unexpectedParameter |
        parameterOutOfRange |
        systemFailure |
        taskRefused |
        unexpectedDataValue |
        unknownPDPID
    }
    CODE opcode-sendChargingInformationGPRS
}

-- Direction: gsmSCF -> gprsSSF, Timer: Tscig
-- This operation is used to instruct the gprsSSF on the charging information which the
-- gprsSSF shall send to the Mobile Station by means of GSM access signalling.

SendChargingInformationGPRSArg {PARAMETERS-BOUND: bound} ::= SEQUENCE {
    sCIGPRSBillingChargingCharacteristics [0] SCIGPRSBillingChargingCharacteristics { bound},
    ...
}

END

CAP-GPRS-ReferenceNumber {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-Network(1) modules(3) cap-dialogueInformation(111) version3(2)}
DEFINITIONS ::= BEGIN

EXPORTS
    id-CAP-GPRS-ReferenceNumber ,
    CAP-GPRS-ReferenceNumber-Abstract-Syntax;

IMPORTS
    Integer4
FROM CS1-DataTypes {ccitt(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}
;

id-CAP-GPRS-ReferenceNumber OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0)
mobileDomain(0) umts-Network(1) as-Id(1) cap-GPRS-ReferenceNumber(5) version3(2)}

CAP-GPRS-ReferenceNumber-Abstract-Syntax ABSTRACT-SYNTAX ::= {CAP-GPRS-ReferenceNumber IDENTIFIED
BY id-CAP-GPRS-ReferenceNumber}

CAP-GPRS-ReferenceNumber ::= SEQUENCE {
    destinationReference [0] Integer4 OPTIONAL,
    originationReference [1] Integer4 OPTIONAL
}
-- This IE is used to identify the relationship between SGSN and the SCP.

END -- of CAP-GPRS-ReferenceNumber

```


CR-Form-v3

CHANGE REQUEST

⌘ **29.078 CR 128** ⌘ rev **3** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘ Correction of Apply Charging Report parameter definition		
Source:	⌘ T-Mobil		
Work item code:	⌘ CAMEL3	Date:	⌘ 08.11.00
Category:	⌘ F	Release:	⌘ R99
	<i>Use one of the following categories:</i> F (essential 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.		<i>Use one of the following releases:</i> 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:	⌘ Current definition of the ACR parameters does not cover the scenario where a tariff switch occurs before the supervised call is answered.
Summary of change:	⌘ The definition of the sub-parameters of the timeDurationChargingResult are modified to cope with the scenario where a tariff switch was detected before answer.
Consequences if not approved:	⌘ Pre Paid Services using AC/ACR will apply in certain scenarios the wrong tariff for cost calculation.

Clauses affected:	⌘ 11.5.1.1	
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘
Other comments:	⌘ The modified definition of the ACR parameters conforms to the requirements of the stage 1 specification. The general behaviour of the elapsed time reports is not modified. Quote from 22.078: When the end of a call period is reached, the IPLMN/VPLMN shall report to the CSE: <ul style="list-style-type: none"> - if no tariff switch has occurred since the call is answered: - report the elapsed time since the call is answered to the CSE, - if a tariff switch has occurred since the call is answered: - report the elapsed time since the last tariff switch has applied, - report the elapsed time from when the call is answered, or from when the previous tariff switch occurred to the time when the most recent tariff switch occurred. 	

11.5 ApplyChargingReport procedure

11.5.1 General description

This operation is used by the gsmSSF to report charging related information to the gsmSCF as requested by the gsmSCF using the "ApplyCharging" operation.

Timing of duration shall be started if answer is detected by the gsmSSF. It shall be started independently for a connection to a Called Party, a Temporary Connection and a gsmSRF connection.

-A report is generated as specified in the 3G TS 23.078 [42].

11.5.1.1 Parameters

- callResult:
This parameter provides the gsmSCF with the charging related information previously requested using the ApplyCharging operation. The "CallResult" is a list, and can contain the following parameters:
- timeDurationChargingResult:
This is a list, and can contain the following parameters:timeInformation:
This is a choice of the following parameters:
 - timeIfNoTariffSwitch:
This parameter will be present if no tariff switch has occurred since the reception of the first ApplyCharging operation since the detection of Answer for the connection to the Called Party, Temporary Connection or gsmSRF connection, otherwise it will be absent.
If present, If Answer was detected for the connection to the Called Party, the Temporary Connection or the gsmSRF connection, then the elapsed time since detection of Answer is shall be reported. If answer was not detected, it shall be set to "0".
 - timeIfTariffSwitch:
This parameter will be present if a tariff switch has occurred since the reception of the first ApplyCharging operation since the detection of Answer for the connection to the Called Party, Temporary Connection or gsmSRF connection, otherwise it will be absent.
If present, then tThe parameter may contain the following information:
 - timeSinceLastTariffSwitch:
The elapsed time since detection of the last tariff switch is reported.If Answer was detected for the connection to the Called Party, the Temporary Connection or the gsmSRF connection, then the elapsed time since detection of Answer or the last tariff switch (whichever of these events was last detected) shall be reported. If Answer was not detected, it shall be set to "0".
 - TariffSwitchInterval:
This parameter is present only if a tariff switch ~~was detected~~ has occurred since the detection of Answer for the connection to the Called Party, the temporary connection or the gsmSRF connection in the reported call period.
If present tThe time interval between either the detection of the Answer event or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.
- partyToCharge:
The "partyToCharge" parameter as received in the related ApplyCharging operation or deduced from the default value, to correlate the result to the request.
- callActive:
This parameter indicates whether the call is still active or has been released.